MEGA-ARC® 4030D
30 Amp Constant Current Diesel Engine-Driven Welding Generator

For the Following Specs:
- 6298C-1
- 6298D-1

THERMAL ARC®
A THERMADYNE® Company

OWNER'S MANUAL Number **430429-231**
Revised December 1, 1997

IMPORTANT: Read these instructions before installing, operating, or servicing this system.

THERMAL ARC INC., TROY, OHIO 45373-1085, U.S.A.

CALIFORNIA
Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

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INTRODUCTION

How To Use This Manual

This Owner's Manual usually applies to just the underlined specification or part numbers listed on the cover. If none are underlined, they are all covered by this manual.

Throughout this manual, the words **WARNING, CAUTION**, and **NOTE** may appear. Pay particular attention to the information provided under these headings. These special annotations are easily recognized as follows:

WARNING gives information regarding possible personal injury. Warnings will be enclosed in a box such as this.

CAUTION refers to possible equipment damage. Cautions will be shown in bold type.

NOTE offers helpful information concerning certain operating procedures. Notes will be shown in italics.

Equipment Identification

The unit's identification number (specification or part number), model, and serial number usually appear on a nameplate attached to the control panel. In some cases, the nameplate may be attached to the rear panel. Equipment which does not have a control panel such as gun and cable assemblies are identified only by the specification or part number printed on the shipping container. Record these numbers for future reference.

Receipt Of Equipment

When you receive the equipment, check it against the invoice to make sure it is complete and inspect the equipment for possible damage due to shipping. If there is any damage, notify the carrier immediately to file a claim. Furnish complete information concerning damage claims or shipping errors to Thermal Arc, Order Department, 2200 Corporate Drive, Troy, Ohio 45373-1085. Include all equipment identification numbers as described above along with a full description of the parts in error.

Move the equipment to the installation site before uncrating the unit. A lifting eye extends through the top of the cabinet on most equipment to facilitate handling with a hoist or crane. Use care to avoid damaging the equipment when using bars, hammers, etc., to uncrate the unit.

WARNING: Falling machine due to lifting eye failure may cause death or serious injury.

- Lifting device may fail when overloaded.
- This lifting device is designed to lift the power source **ONLY**. If the machine is equipped with a trailer or accessories over 100 pounds, **DO NOT LIFT** by lifting eyes.
- Avoid sudden jerks, drops, or swinging.
- Check lifting device components visually for looseness and signs of metal fatigue.
- Before changing any hardware, check grade and size of bolts, and replace with bolts of equal or higher size and grade.

Additional copies of this manual may be purchased by contacting Thermal Arc at the address given above. Include the Owner's Manual number and equipment identification numbers.

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ARC WELDING SAFETY INSTRUCTIONS AND WARNINGS

⚠ WARNING

ARC WELDING can be hazardous.

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS KEEP AWAY UNTIL CONSULTING YOUR DOCTOR. DO NOT LOSE THESE INSTRUCTIONS. READ OPERATING/INSTRUCTION MANUAL BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.

Welding products and welding processes can cause serious injury or death, or damage to other equipment or property, if the operator does not strictly observe all safety rules and take precautionary actions.

Safe practices have developed from past experience in the use of welding and cutting. These practices must be learned through study and training before using this equipment. Anyone not having extensive training in welding and cutting practices should not attempt to weld. Certain of the practices apply to equipment connected to power lines; other practices apply to engine driven equipment.

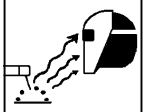
Safe practices are outlined in the American National Standard Z49.1 entitled: SAFETY IN WELDING AND CUTTING. This publication and other guides to what you should learn before operating this equipment are listed at the end of these safety precautions.

HAVE ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR WORK PERFORMED ONLY BY QUALIFIED PEOPLE.

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Insulate yourself from work and ground using dry insulating mats or covers.
4. Disconnect input power or stop engine before installing or servicing this equipment. Lock input power disconnect switch open, or remove line fuses so power cannot be turned on accidentally.
5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
6. Turn off all equipment when not in use. Disconnect power to equipment if it will be left unattended or out of service.
7. Use fully insulated electrode holders. Never dip holder in water to cool it or lay it down on the ground or the work surface. Do not touch holders connected to two welding machines at the same time or touch other people with the holder or electrode.
8. Do not use worn, damaged, undersized, or poorly spliced cables.
9. Do not wrap cables around your body.
10. Ground the workpiece to a good electrical (earth) ground.
11. Do not touch electrode while in contact with the work (ground) circuit.
12. Use only well-maintained equipment. Repair or replace damaged parts at once.
13. In confined spaces or damp locations, do not use a welder with AC output unless it is equipped with a voltage reducer. Use equipment with DC output.
14. Wear a safety harness to prevent falling if working above floor level.
15. Keep all panels and covers securely in place.



ARC RAYS can burn eyes and skin; NOISE can damage hearing.

Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.

1. Wear a welding helmet fitted with a proper shade of filter (see ANSI Z49.1 listed in Safety Standards) to protect your face and eyes when welding or watching.
2. Wear approved safety glasses. Side shields recommended.
3. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.
5. Use approved ear plugs or ear muffs if noise level is high.

Eye protection filter shade selector for welding or cutting (goggles or helmet), from AWS A6.2-73.

Welding or Cutting Operation	Electrode Size Metal Thickness or Welding Current	Filter Shade No.
Torch soldering	—	2
Torch brazing	—	3 or 4
Oxygen cutting		
Light	Under 1 in., 25 mm	3 or 4
Medium	1 to 6 in., 25-150 mm	4 or 5
Heavy	Over 6 in., 150 mm	5 or 6
Gas welding		
Light	Under 1/8 in., 3 mm	4 or 5
Medium	1/8 to 1/2 in., 3-12 mm	5 or 6
Heavy	Over 1/2 in., 12 mm	6 or 8
Shielded metal-arc welding (stick) electrodes	Under 5/32 in., 4 mm	10
	5/32 to 1/4 in., 4 to 6.4 mm	12
	Over 1/4 in., 6.4 mm	14

Welding or Cutting Operation	Electrode Size Metal Thickness or Welding Current	Filter Shade No.
Gas metal-arc welding (MIG)		
Non-ferrous base metal	All	11
Ferrous base metal	All	12
Gas tungsten arc welding (TIG)	All	12
Atomic hydrogen welding	All	12
Carbon arc welding	All	12
Plasma arc welding	All	12
Carbon arc air gouging		
Light		12
Heavy		14
Plasma arc cutting		
Light	Under 300 Amp	9
Medium	300 to 400 Amp	12
Heavy	Over 400 Amp	14

FUMES AND GASES can be hazardous to your health.

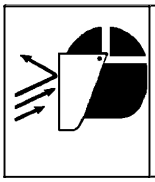
Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

1. Keep your head out of the fumes. Do not breath the fumes.
2. If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals, consumables, coatings, and cleaners.
5. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.
6. Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
7. Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

WELDING can cause fire or explosion.

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.

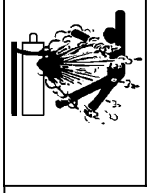
1. Protect yourself and others from flying sparks and hot metal.
2. Do not weld where flying sparks can strike flammable material.
3. Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
4. Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
5. Watch for fire, and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
7. Do not weld on closed containers such as tanks or drums.
8. Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
9. Do not use welder to thaw frozen pipes.
10. Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
11. Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.



FLYING SPARKS AND HOT METAL can cause injury.

Chipping and grinding cause flying metal. As welds cool, they can throw off slag.

1. Wear approved face shield or safety goggles. Side shields recommended.
2. Wear proper body protection to protect skin.



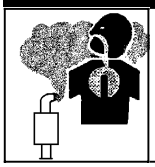
CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.
5. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
6. Turn face away from valve outlet when opening cylinder valve.
7. Keep protective cap in place over valve except when cylinder is in use or connected for use.
8. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

⚠ WARNING

ENGINES can be hazardous.



ENGINE EXHAUST GASES can kill.

Engines produce harmful exhaust gases.

1. Use equipment outside in open, well-ventilated areas.
2. If used in a closed area, vent engine exhaust outside and away from any building air intakes.

ENGINE FUEL can cause fire or explosion.

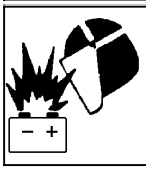
Engine fuel is highly flammable.

1. Stop engine before checking or adding fuel.
2. Do not add fuel while smoking or if unit is near any sparks or open flames.
3. Allow engine to cool before fueling. If possible, check and add fuel to cold engine before beginning job.
4. Do not overfill tank — allow room for fuel to expand.
5. Do not spill fuel. If fuel is spilled, clean up before starting engine.

MOVING PARTS can cause injury.

Moving parts, such as fans, rotors, and belts can cut fingers and hands and catch loose clothing.

1. Keep all doors, panels, covers, and guards closed and securely in place.
2. Stop engine before installing or connecting unit.
3. Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
4. To prevent accidental starting during servicing, disconnect negative (-) battery cable from battery.
5. Keep hands, hair, loose clothing, and tools away from moving parts.
6. Reinstall panels or guards and close doors when servicing is finished and before starting engine.



SPARKS can cause BATTERY GASES TO EXPLODE; BATTERY ACID can burn eyes and skin.

Batteries contain acid and generate explosive gases.

1. Always wear a face shield when working on a battery.
2. Stop engine before disconnecting or connecting battery cables.
3. Do not allow tools to cause sparks when working on a battery.
4. Do not use welder to charge batteries or jump start vehicles.
5. Observe correct polarity (+ and –) on batteries.

STEAM AND PRESSURIZED HOT COOLANT can burn face, eyes, and skin.

The coolant in the radiator can be very hot and under pressure.

1. Do not remove radiator cap when engine is hot. Allow engine to cool.
2. Wear gloves and put a rag over cap area when removing cap.
3. Allow pressure to escape before completely removing cap.

WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Sec. 25249.5 et seq.)

NOTE: Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, Biological Effects of Power Frequency Electric & Magnetic Fields — Background Paper, OTA-BP-E-63 (Washington, DC: U.S. Government Printing Office, May 1989): "... there is now a very large volume of scientific findings based on experiments at the cellular level and from studies with animals and people which clearly establish that low frequency magnetic fields can interact with, and produce changes in, biological systems. While most of this work is of very high quality, the results are complex. Current scientific understanding does not yet allow us to interpret the evidence in a single coherent framework. Even more frustrating, it does not yet allow us to draw definite conclusions about questions of possible risk or to offer clear science-based advice on strategies to minimize or avoid potential risks."

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around the body.
4. Keep welding power source and cables as far away from body as practical.

About Pacemakers:

The above procedures are among those also normally recommended for pacemaker wearers. Consult your doctor for complete information.

PRINCIPAL SAFETY STANDARDS

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

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PRECAUTIONS DE SECURITE EN SOUDAGE A L´ARC

MISE EN GARDE

LE SOUDAGE A L´ARC EST DANGEREUX

PROTEGEZ-VOUS, AINSI QUE LES AUTRES, CONTRE LES BLESSURES GRAVES POSSIBLES OU LA MORT. NE LAISSEZ PAS LES ENFANTS S'APPROCHER, NI LES PORTEURS DE STIMULATEUR CARDIAQUE (A MOINS QU'ILS N'AIENT CONSULTE UN MEDECIN). CONSERVEZ CES INSTRUCTIONS. LISEZ LE MANUEL D'OPERATION OU LES INSTRUCTIONS AVANT D'INSTALLER, UTILISER OU ENTRETENIR CET EQUIPEMENT.

Les produits et procédés de soudage peuvent sauser des blessures graves ou la mort, de même que des dommages au reste du matériel et à la propriété, si l'utilisateur n'adhère pas strictement à toutes les règles de sécurité et ne prend pas les précautions nécessaires.

En soudage et coupage, des pratiques sécuritaires se sont développées suite à l'expérience passée. Ces pratiques doivent être apprises par étude ou entraînement avant d'utiliser l'equipement. Toute personne n'ayant pas suivi un entraînement intensif en soudage et coupage ne devrait pas tenter de souder. Certaines pratiques concernent les équipements raccordés aux lignes d'alimentation alors que d'autres s'adressent aux groupes électrogènes.

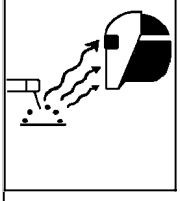
La norme Z49.1 de l'American National Standard, intitulée "SAFETY IN WELDING AND CUTTING" présente les pratiques sécuritaires à suivre. Ce document ainsi que d'autres guides que vous devriez connaître avant d'utiliser cet équipement sont présentés à la fin de ces instructions de sécurité.

SEULES DES PERSONNES QUALIFIEES DOIVENT FAIRE DES TRAVAUX D'INSTALLATION, DE REPARATION, D'ENTRETIEN ET D'ESSAI.

L'ELECTROCUTION PEUT ETRE MORTELLE.

Une décharge électrique peut tuer ou brûler gravement. L'électrode et le circuit de soudage sont sous tension dès la mise en circuit. Le circuit d'alimentation et les circuits internes de l'équipement sont aussi sous tension dès la mise en marche. En soudage automatique ou semi-automatique avec fil, ce dernier, le rouleau ou la bobine de fil, le logement des galets d'entrainement et toutes les pièces métalliques en contact avec le fil de soudage sont sous tension. Un équipement inadéquatement installé ou inadéquatement mis à la terre est dangereux.

1. Ne touchez pas à des pièces sous tension.
2. Portez des gants et des vêtements isolants, secs et non troués.
3. Isolez-vous de la pièce à souder et de la mise à la terre au moyen de tapis isolants ou autres.
4. Déconnectez la prise d'alimentation de l'équipement ou arrêtez le moteur avant de l'installer ou d'en faire l'entretien. Bloquez le commutateur en circuit ouvert ou enlevez les fusibles de l'alimentation afin d'éviter une mise en marche accidentelle.
5. Veuillez à installer cet équipement et à le mettre à la terre selon le manuel d'utilisation et les codes nationaux, provinciaux et locaux applicables.
6. Arrêtez tout équipement après usage. Coupez l'alimentation de l'équipement s'il est hors d'usage ou inutilisé.
7. N'utilisez que des porte-électrodes bien isolés. Ne jamais plonger les porte-électrodes dans l'eau pour les refroidir. Ne jamais les laisser traîner par terre ou sur les pièces à souder. Ne touchez pas aux porte-électrodes raccordés à deux sources de courant en même temps. Ne jamais toucher quelqu'un d'autre avec l'électrode ou le porte-électrode.
8. N'utilisez pas de câbles électriques usés, endommagés, mal épissés ou de section trop petite.
9. N'enroulez pas de câbles électriques autour de votre corps.
10. N'utilisez qu'une bonne prise de masse pour la mise à la terre de la pièce à souder.
11. Ne touchez pas à l'électrode lorsqu'en contact avec le circuit de soudage (terre).
12. N'utilisez que des équipements en bon état. Réparez ou remplacez aussitôt les pièces endommagées.
13. Dans des espaces confinés ou mouillés, n'utilisez pas de source de courant alternatif, à moins qu'il soit muni d'un réducteur de tension. Utilisez plutôt une source de courant continu.
14. Portez un harnais de sécurité si vous travaillez en hauteur.
15. Fermez solidement tous les panneaux et les capots.



LE RAYONNEMENT DE L´ARC PEUT BRÛLER LES YEUX ET LA PEAU; LE BRUIT PEUT ENDOMMAGER L´OUIE.

L'arc de soudage produit une chaleur et des rayons ultraviolets intenses, susceptibles de brûler les yeux et la peau. Le bruit causé par certains procédés peut endommager l'ouïe.

1. Portez une casque de soudeur avec filtre oculaire de nuance appropriée (consultez la norme ANSI Z49 indiquée ci-après) pour vous protéger le visage et les yeux lorsque vous soudez ou que vous observez l'exécution d'une soudure.
2. Portez des lunettes de sécurité approuvées. Des écrans latéraux sont recommandés.
3. Entourez l'aire de soudage de rideaux ou de cloisons pour protéger les autres des coups d'arc ou de l'éblouissement; avertissez les observateurs de ne pas regarder l'arc.
4. Portez des vêtements en matériaux ignifuges et durables (laine et cuir) et des chaussures de sécurité.
5. Portez un casque antibruit ou des bouchons d'oreille approuvés lorsque le niveau de bruit est élevé.

SELECTION DES NUANCES DE FILTRES OCULAIRES POUR LA PROTECTION DES YEUX EN COUPAGE ET SOUDAGE
(selon AWS A 8.2-73)

Opération de Coupage ou soudage	Dimension d'électrode ou Epaisseur de métal ou Intensité de courant	Nuance de de filtre oculaire
Brasage tendre au chalumeau	toutes conditions	2
Brasage fort au chalumeau	toutes conditions	3 ou 4
Oxycoupage		
mince	moins de 1 po. (25 mm)	2 ou 3
moyen	de 1 à 6 po. (25 à 150 mm)	4 ou 5
épais	plus de 6 po. (150 mm)	5 ou 6
Soudage aux gaz		
mince	moins de 1/8 po. (3 mm)	4 ou 5
moyen	de 1/8 à 1/2 po. (3 à 12 mm)	5 ou 6
épais	plus de 1/2 po. (12 mm)	6 ou 8
Soudage à l'arc avec	moins de 5/32 po. (4 mm)	10
electrode enrobées (SMAW)	de 5/32 à 1/4 po. (4 à 6.4 mm)	12
	plus de 1/4 po. (6.4 mm)	14
Soudage à l'arc sous gaz avec fil plein (GMAW)		
métaux non-ferreux	toutes conditions	11
métaux ferreux	toutes conditions	12
Soudage à l'arc sous gaz avec électrode de tungstène (GTAW)	toutes conditions	12
Soudage à l'hydrogène atomique (AHW)	toutes conditions	12
Soudage à l'arc avec électrode de carbone (CAW)	toutes conditions	12
Soudage à l'arc Plasma (PAW)	toutes dimensions	12
Gougeage Air-Arc avec électrode de carbone		
mince		12
épais		14
Coupage à l'arc Plasma (PAC)		
mince	moins de 300 ampères	9
moyen	de 300 à 400 ampères	12
épais	plus de 400 ampères	14

LES VAPEURS ET LES FUMEES SONT DANGEREUSES POUR LA SANTE.

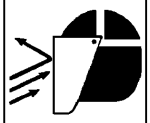
Le soudage dégage des vapeurs et des fumées dangereuses à respirer.

1. Eloignez la tête des fumées pour éviter de les respirer.
2. A l'intérieur, assurez-vous que l'aire de soudage est bien ventilée ou que les fumées et les vapeurs sont aspirées à l'arc.
3. Si la ventilation est inadequate, portez un respirateur à adduction d'air approuvé.
4. Lisez les fiches signalétiques et les consignes du fabricant relatives aux métaux, aux produits consummables, aux revêtements et aux produits nettoyants.
5. Ne travaillez dans un espace confiné que s'il est bien ventilé; sinon, portez un respirateur à adduction d'air. Les gaz protecteurs de soudage peuvent déplacer l'oxygène de l'air et ainsi causer des malaises ou la mort. Assurez-vous que l'air est propre à la respiration.
6. Ne soudez pas à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir avec des vapeurs et former des gaz hautement toxiques et irritants.
7. Ne soudez des tôles galvanisées ou plaquées au plomb ou au cadmium que si les zones à souder ont été grattées à fond, que si l'espace est bien ventilé; si nécessaire portez un respirateur à adduction d'air. Car ces revêtements et tout métal qui contient ces éléments peuvent dégager des fumées toxiques au moment du soudage.

LE SOUDAGE PEUT CAUSER UN INCENDIE OU UNE EXPLOSION

L'arc produit des étincellies et des projections. Les particules volantes, le métal chaud, les projections de soudure et l'équipement surchauffé peuvent causer un incendie et des brûlures. Le contact accidentel de l'électrode ou du fil-électrode avec un objet métallique peut provoquer des étincelles, un échauffement ou un incendie.

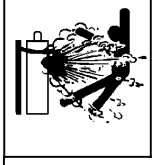
1. Protégez-vous, ainsi que les autres, contre les étincelles et du métal chaud.
2. Ne soudez pas dans un endroit où des particules volantes ou des projections peuvent atteindre des matériaux inflammables.
3. Enlevez toutes matières inflammables dans un rayon de 10, 7 mètres autour de l'arc, ou couvrez-les soigneusement avec des bâches approuvées.
4. Méfiez-vous des projections brulantes de soudage susceptibles de pénétrer dans des aires adjacentes par de petites ouvertures ou fissures.
5. Méfiez-vous des incendies et gardez un extincteur à portée de la main.
6. N'oubliez pas qu'une soudure réalisée sur un plafond, un plancher, une cloison ou une paroi peut enflammer l'autre côté.
7. Ne soudez pas un récipient fermé, tel un réservoir ou un baril.
8. Connectez le câble de soudage le plus près possible de la zone de soudage pour empêcher le courant de suivre un long parcours inconnu, et prévenir ainsi les risques d'électrocution et d'incendie.
9. Ne dégelez pas les tuyaux avec un source de courant.
10. Otez l'électrode du porte-électrode ou coupez le fil au tube-contact lorsqu'inutilisé après le soudage.
11. Portez des vêtements protecteurs non huileux, tels des gants en cuir, une chemise épaisse, un pantalon revers, des bottines de sécurité et un casque.



LES ETINCELLES ET LES PROJECTIONS BRULANTES PEUVENT CAUSER DES BLESSURES.

Le piquage et le meulage produisent des particules métalliques volantes. En refroidissant, la soudure peut projeter du éclats de laitier.

1. Portez un écran facial ou des lunettes protectrices approuvées. Des écrans latéraux sont recommandés.
2. Portez des vêtements appropriés pour protéger la peau.



LES BOUTEILLES ENDOMMAGEES PEUVENT EXPLOSER

Les bouteilles contiennent des gaz protecteurs sous haute pression. Des bouteilles endommagées peuvent exploser. Comme les bouteilles font normalement partie du procédé de soudage, traitez-les avec soin.

1. Protégez les bouteilles de gaz comprimé contre les sources de chaleur intense, les chocs et les arcs de soudage.
2. Enchainez verticalement les bouteilles à un support ou à un cadre fixe pour les empêcher de tomber ou d'être renversées.
3. Eloignez les bouteilles de tout circuit électrique ou de tout soudage.
4. Empêchez tout contact entre une bouteille et une électrode de soudage.
5. N'utilisez que des bouteilles de gaz protecteur, des détendeurs, des boyauxs et des raccords conçus pour chaque application spécifique; ces équipements et les pièces connexes doivent être maintenus en bon état.
6. Ne placez pas le visage face à l'ouverture du robinet de la bouteille lors de son ouverture.
7. Laissez en place le chapeau de bouteille sauf si en utilisation ou lorsque raccordé pour utilisation.
8. Lisez et respectez les consignes relatives aux bouteilles de gaz comprimé et aux équipements connexes, ainsi que la publication P-1 de la CGA, identifiée dans la liste de documents ci-dessous.

MISE EN GARDE

LES MOTEURS PEUVENT ETRE DANGEREUX

LES GAZ D'ECHAPPEMENT DES MOTEURS PEUVENT ETRE MORTELS.

Les moteurs produisent des gaz d'échappement nocifs.

1. Utilisez l'équipement à l'extérieur dans des aires ouvertes et bien ventilées.
2. Si vous utilisez ces équipements dans un endroit confiné, les fumées d'échappement doivent être envoyées à l'extérieur, loin des prises d'air du bâtiment.

LE CARBURANT PEUR CAUSER UN INCENDIE OU UNE EXPLOSION.

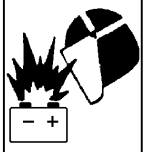
Le carburant est hautement inflammable.

1. Arrêtez le moteur avant de vérifier le niveau de carburant ou de faire le plein.
2. Ne faites pas le plein en fumant ou proche d'une source d'étincelles ou d'une flamme nue.
3. Si c'est possible, laissez le moteur refroidir avant de faire le plein de carburant ou d'en vérifier le niveau au début du soudage.
4. Ne faites pas le plein de carburant à ras bord: prévoyez de l'espace pour son expansion.
5. Faites attention de ne pas renverser de carburant. Nettoyez tout carburant renversé avant de faire démarrer le moteur.

DES PIECES EN MOUVEMENT PEUVENT CAUSER DES BLESSURES.

Des pièces en mouvement, tels des ventilateurs, des rotors et des courroies peuvent couper doigts et mains, ou accrocher des vêtements amples.

1. Assurez-vous que les portes, les panneaux, les capots et les protecteurs soient bien fermés.
2. Avant d'installer ou de connecter un système, arrêtez le moteur.
3. Seules des personnes qualifiées doivent démonter des protecteurs ou des capots pour faire l'entretien ou le dépannage nécessaire.
4. Pour empêcher un démarrage accidentel pendant l'entretien, débranchez le câble d'accumulateur à la borne négative.
5. N'approchez pas les mains ou les cheveux de pièces en mouvement; elles peuvent aussi accrocher des vêtements amples et des outils.
6. Réinstallez les capots ou les protecteurs et fermez les portes après des travaux d'entretien et avant de faire démarrer le moteur.



DES ETINCELLES PEUVENT FAIRE EXPLOSER UN ACCUMULATEUR; L'ELECTROLYTE D'UN ACCUMULATEUR PEUT BRULER LA PEAU ET LES YEUX.

Les accumulateurs contiennent de l'électrolyte acide et dégagent des vapeurs explosives.

1. Portez toujours un écran facial en travaillant sur un accumulateur.
2. Arrêtez le moteur avant de connecter ou de déconnecter des câbles d'accumulateur.
3. N'utilisez que des outils anti-étincelles pour travailler sur un accumulateur.
4. N'utilisez pas une source de courant de soudage pour charger un accumulateur ou survolter momentanément un véhicule.
5. Utilisez la polarité correcte (+ et –) de l'accumulateur.

LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT BRULANT SOUS PRESSION PEUVENT BRULER LA PEAU ET LES YEUX.

Le liquide de refroidissement d'un radiateur peut être brûlant et sous pression.

1. N'ôtez pas le bouchon de radiateur tant que le moteur n'est pas refroidi.
2. Mettez des gants et posez un torchon sur le bouchon pour l'ôter.
3. Laissez la pression s'échapper avant d'ôter complètement le bouchon.

PRINCIPALES NORMES DE SECURITE

Safety in Welding and Cutting, norme ANSI Z49.1, American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33128.

Safety and Health Standards, OSHA 29 CFR 1910, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, norme AWS F4.1, American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33128.

National Electrical Code, norme 70 NFPA, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, document P-1, Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, norme CSA W117.2 Association canadienne de normalisation, Standards Sales, 276 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, norme ANSI Z87.1, American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme 51B NFPA, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

DESCRIPTION OF EQUIPMENT

Generator

The Mega-Arc® diesel engine-driven arc welding machine is a self-contained unit, mounted on a welded steel frame. The unit is covered by a sheet metal canopy, bolted directly to the frame. The control panel is at the back (generator) end of the unit.

The welding generator and auxiliary (exciter) generator revolving fields are mounted on a single heavy-duty shaft, supported by a ball bearing at the exciter end of the shaft, and by the engine coupling at the other end.

The welding generator is 300 ampere @ 100% duty cycle or 400 ampere @ 60% duty cycle, 3-phase, wye connected, rectified to DC power by the output rectifier, and stabilized by the stability reactor.

The auxiliary generator is self-excited. The AC voltage output furnishes 115-volt power to a diode bridge rectifier which provides DC voltage for excitation of the auxiliary generator fields and welding generator fields. It provides 115-volt and 230-volt AC power to the receptacles on the Control Panel for operation of small tools, lights, etc. See Tabulated Data for rated auxiliary power of your unit.

Engine

The engine used in this unit is a Perkins Industrial 3-152 diesel engine. It is directly coupled to the welding generator shaft by a flexible coupling.

Identification

The welding generator unit has an identification plate attached to the control panel on the left-hand side. The unit is identified as to SPEC number, by the dash (—) number which follows it.

The engine identification number is stamped on right-hand side of the cylinder block. When ordering spare parts, or communicating about this machine, be sure to specify the engine serial number, engine type, unit specification and serial numbers. Left- and right-hand sides of the unit are determined when facing the control panel. See Supplementary Materials for address for communicating or ordering engine parts.

Tabulated Data

Generator:

Output, Auxiliary Power .... 3kVA, 115/230V AC

Output, Welding Generator ..... 12 kW

Amperes, rated ..... 300 Amps

Voltage, rated..... 40 Volts

Voltage, open-circuit ..... (max.) 75 Volts

Duty Cycle, rated 100%

Current Range ..... Low Range 15 to 200 A

.....High Range 30 to 400 A

Operating Speed..... See Engine Data

Engine:

Make and model —

..... Detroit Diesel/Perkins 3-152

Type ..... Industrial diesel

Displacement .....152 cu. in. (2.50 liters)

Brake horsepower..... 38 BHP @ 1800 RPM

Oil sump capacity..... 7-1/2 quarts (7 liters)

Cooling system capacity —

..... 9-1/2 quarts (9 liters)

Fuel tank capacity —

..... 17 gallons (U.S.) (64.4 liters)

Weight (dry) ..... 463 pounds (210 kg)

Normal operating RPM ..... 1800 RPM

Dimensions and Weight: (See Figure 4-1)

Width (doors closed)..... 28 inches (711 mm)

Width (doors open) ..... 77 inches (1956 mm)

Length..... 61-1/2 inches (1562 mm)

Height (top of canopy) —

..... 40 inches (1016 mm)

Height (over eye in top) —

..... 45 inches (1143 mm)

Weight (shipping) —

..... approx. 1600 pounds (726 kg)

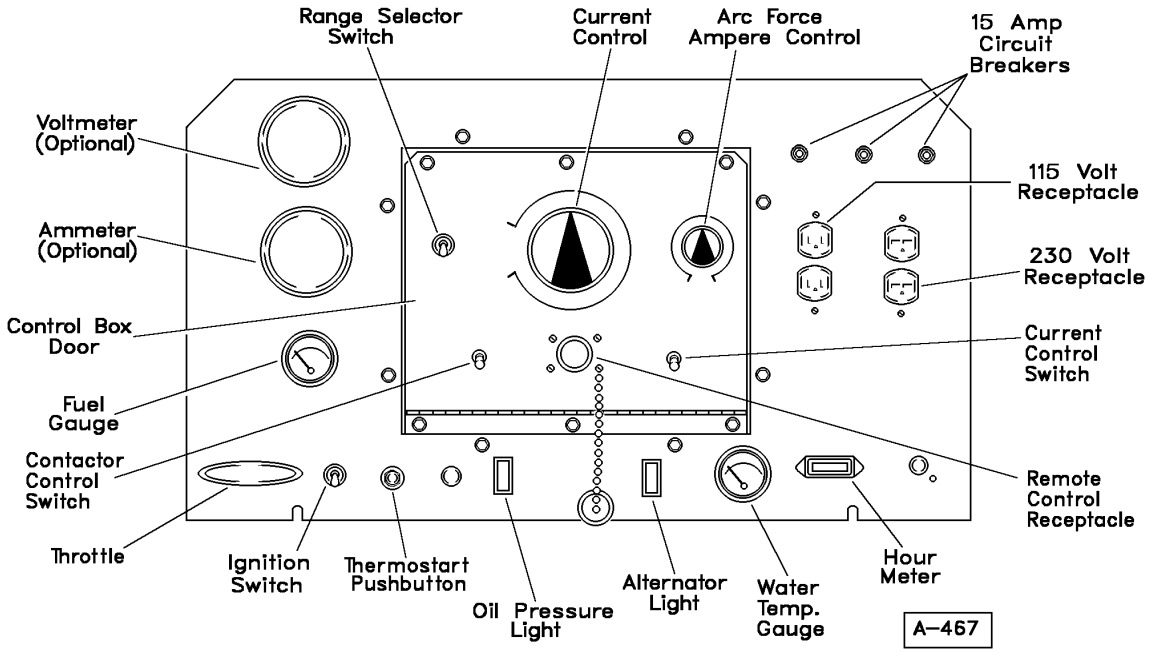


Figure 3-1 Control Panel

Supplementary Materials

A copy of the Perkins Handbook for Diesel Engines is included with each welding generator unit. Additional copies may be obtained from the manufacturer.

Engine Controls and Instruments

Ignition Switch — The diesel engine starting motor is actuated by this switch, located in the lower left-hand corner of the control panel. Do NOT crank the engine for more than 30 seconds at a time, as this may cause the starting motor to overheat. Allow motor to cool before attempting to start the engine again. Place switch in START position to start, and return to RUN position after the engine has started. When engine is shut down, place switch in OFF position.

NOTE: Switch must be in OFF position to avoid lighting the Alternator and Oil Pressure light.

Throttle — This control shuts the diesel fuel supply off, for normal shutdown of the engine. Pull the control handle *OUT* all the way for engine to run at rated RPM (1800). Push the handle *IN* against the panel to shut engine down. Turn control handle counterclockwise to loosen, and clockwise to lock it in position.

Thermostart Pushbutton — Place the starter switch in *RUN* position and hold the pushbutton *IN* for 15 to 20 seconds, prior to placing the starter switch in *START* position. Continue to hold it *IN* until engine fires.

CAUTION: Do not hold the pushbutton IN for any longer period of time than the 20 seconds (above). If engine does not start first time, place starter switch in OFF position, then repeat above procedure.

Oil Pressure Light — Glows (red) when oil pressure drops to 3-5 psi for any reason.

Alternator Light — Glows when engine alternator circuit is not charging the battery at sufficient level.

Fuel Gauge — Indicates level of fuel in fuel tank.

Hour Meter — Indicates run time on engine.

Water Temp. Gauge — Indicates coolant temperature.

Generator Controls

Range Selector Switch — This toggle switch is used to select either the low or high welding range, as indicated on the Current Control.

Current Control — The welding current control is located in the center of the control box door panel. Turning knob clockwise will increase welding current, counterclockwise will decrease current.

Voltmeter (Optional) — Indicates open-circuit and welding arc voltage, when supplied.

Ammeter (Optional) — Indicates welding current being used to weld, when supplied.

Arc Force Ampere Control — Varies the short-circuit (welding arc) current and produces an increase of amperage when arc length is shortened. Turning this control clockwise increases arc force, counterclockwise decreases arc force. See Operation chapter for details.

Welding Terminals — (See Figure 3-2) — The two welding terminals are located on the Welding Output Panel, which is located on the left-hand side of the unit (facing the control panel). See instructions in Initial Preparation for Use located in the Installation chapter.

Auxiliary Power Receptacle — Duplex receptacles located on the Control Panel (see Figure 3-1) furnish 3-kVA, 115-volt and 230-volt, 60-Hz power.

NOTE: The output voltage will drop below the rated volts when engine is in the idling mode. Low voltage may damage electrical equipment connected to the generator through this receptacle.

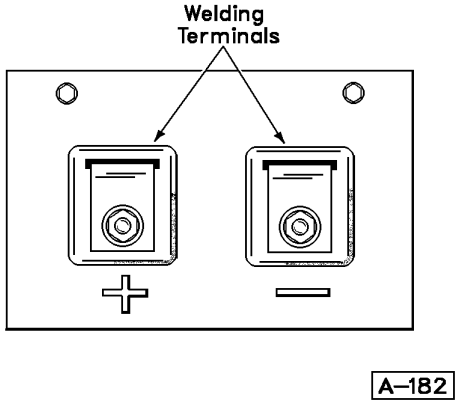
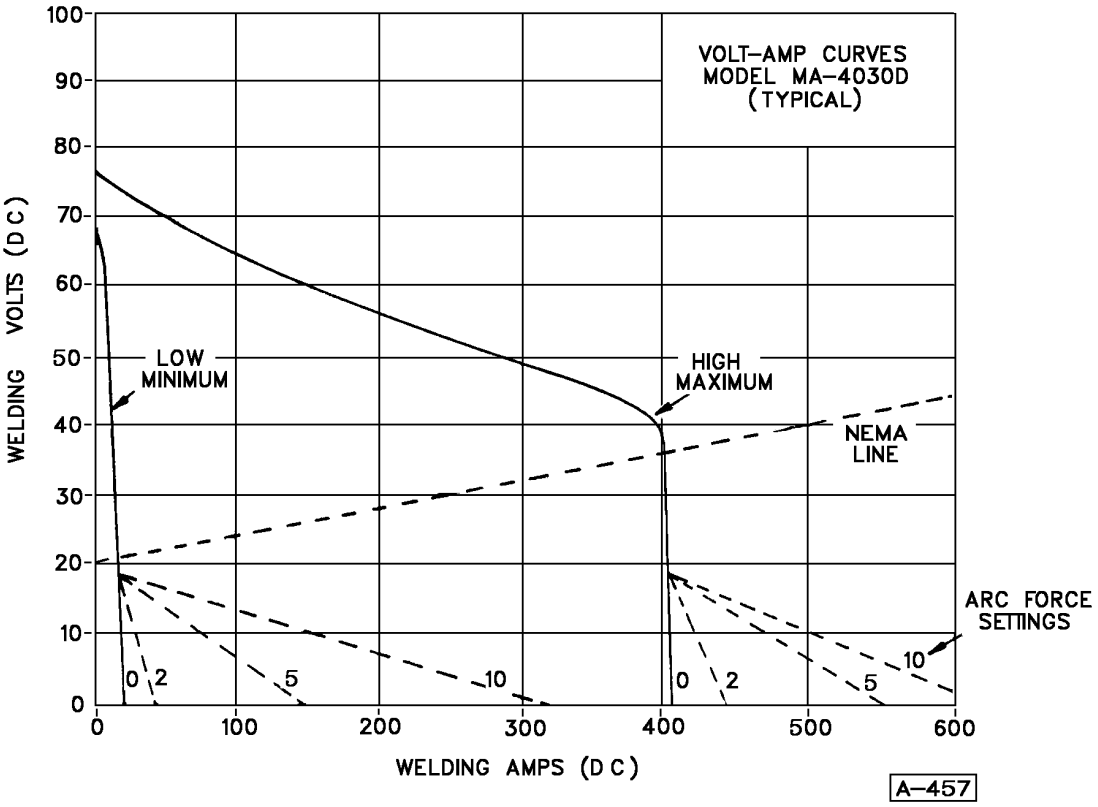


Figure 3-2 Weld Output Panel



Volt-Ampere Curve

INSTALLATION

General Engine Driven Welder Installation

The frame of an engine driven welder is intended to be a base to held the welder components together. This frame is not intended to be the primary structure of a trailer or wagon. This welder is intended to be installed on a rigid, flat surface. This surface must allow the weight of the welder to be distributed evenly along the length of the welder frame.

Never install any vibration isolation material (shock mounts, etc.) beneath the welder frame. This could defeat the engine/generator shock mounts and cause abnormal vibration throughout the welder and produce vibration related problems.

Before choosing an installation location, make note of where the service items are located on the welder (oil change/fill, battery, air filter, fuel fill, etc.) Install the welder for best access to the important service items. Allow sufficient room for cooling air intake and exhaust.

If you are unsure about any installation consult the factory.

Trailer Installation: Do not use the frame assembly of this welder as the frame of a trailer (do not attach axles or tongues directly to this frame). When a trailer is required, use only trailers with its own support frame that has a gross weight rated to carry the weight of the welder and any other components mounted on the trailer. Be sure the trailer tires are for use with trailers. The soft sidewall design used in radial tires can cause vibration related problems. Be sure welder frame and trailer frame are electrically bonded together.

Truck Bed Installation: When installing this welder on the bed of a truck allow the welder to sit flat on the bed, or a surface which completely contacts the bottom of the welder frame. Do not modify the welder frame by cutting or otherwise damaging it or the warranty may be voided. Bolt the welder frame directly to the bed to secure it. Do not install any vibration absorption device (shock mounts, etc) between the welder and the truck bed. Be sure welder frame and truck frame are electrically bonded together.

Ground Installation: The welder will operate perfectly fine just sitting on the ground, with or without the shipping skid. No special precautions are required.

Location

For best operating characteristics and longest unit life, take care in selecting an installation site. Avoid locations exposed to high humidity, dust, high ambient temperature, or corrosive fumes. Moisture can condense on electrical components, causing corrosion or shorting of circuits. Dirt on components helps retain this moisture and also increases wear on moving parts.

Safety

Refer to additional installation instructions under the Safety Warnings chapter included in this manual.

Indoor Installation

Adequate air circulation is needed at all times in order to assure proper operation. Provide at least 24 inches (610 mm) of space at radiator end of unit. Make sure that ventilation openings are not obstructed. Allow ample space to open canopy doors on sides of the unit (see Tabulated Data in Description of Equipment chapter for dimensions) for servicing, and space at the control panel end of unit for operation.

If unit is to be operated inside a building, make certain there is adequate ventilation to carry off escaping exhaust fumes and to provide an ample supply of oxygen.

Place unit so that exhaust fumes are carried out of the building using the shortest exhaust pipe possible and one with the fewest possible number of bends. Exhaust back pressure can seriously affect engine efficiency.

All exhaust connections must be gastight.

Portable Installation

For portable use, the machine may be located within 12 inches (305 mm) of a truck cab, panel, or whatever, if it is to be operated in the open air.

The engine of the welding machine must be placed at the tongue end of the portable mounting for

proper balance. If leads, etc., are to be stored on the unit, they must be forward of the axle to maintain proper balance of loading on the tongue end of the unit.

NOTE: The unit should be operated in as near a normal horizontal position as possible and never at a tilt greater than 10° sideways and/or 7° maximum, rear down.

Initial Preparation For Use

1. Open canopy doors on sides of engine.

CAUTION: The canopy doors may fall to a closed position during operation of the unit if it is resting on an inclined surface, or for other reasons. Tie the doors to each other, to lifting eye or fuel filler cap. Failure to do so may result in injury to operating personnel.

2. Inspect unit thoroughly to be sure it is in proper working order. Check all fuel and wire connections to be certain they are secure. Tighten any loose screws, nuts, or bolts. Check closely for any damage which may have occurred in transit.

3. Remove all special tags from the machine, read carefully and follow any special directions they may carry. Keep tags with manual for future reference.

4. Make certain that all radiator air passages and cooling fins are free from foreign matter. Use clean, dry compressed air to blow dirt and dust out of cooling passages and control cabinet, 25 psi (172 kPa) maximum pressure.

5. Attach battery cables to poles of battery as indicated on wiring diagram. The negative (—) pole should be grounded to the frame of the unit in a secure manner.

WARNING: Connect proper battery cable clamp to the positive (+) battery post first, then the other cable clamp to the negative (—) post.

CAUTION: A short circuit to rectifier is created if a battery is installed with polarity reversed. Current can flow from positive terminal of battery through negative and positive rectifiers and into heat sink. From heat sink a completed circuit exists back to negative battery terminal. Full battery voltage will be impressed on rectifiers, in the alternator. The resulting high current will damage rectifiers and/or wiring harness.

6. Fill fuel tank with grade of fuel recommended by engine manufacturer. (Consult engine instruction manual.) Be sure fuel is free of WATER and other foreign matter. Make sure air vent to fuel tank is open. See Safety Warnings chapter included in this manual for precautions necessary when filling the tank.

7. Check to be sure that radiator is full (about 1" below neck). If not, add enough coolant (50/50 mix of water and antifreeze) to fill.

8. Pull the dipstick and check the oil level in crankcase. If it is necessary to add oil, fill to dipstick mark with correct seasonal grade of quality detergent oil. See engine operator's manual for recommended viscosity and temperature chart (unit is shipped with SAE 10W30 oil installed).

9. After engine has been properly prepared for use, start the engine, and allow it to idle for *30 minutes or so*. Carefully check again for any leaks or loose connections during this period.

10. Determine which welding polarity will be suitable for the welding job to be done.

a. For STRAIGHT polarity (DCEN) attach ELECTRODE lead (leading to electrode holder) to the NEGATIVE (—) terminal on the Terminal and Receptacle Panel. Attach the WORK lead (with clamp on end) to POSITIVE (+) terminal.

b. For REVERSE polarity (DCEP) attach ELECTRODE lead (leading to electrode holder) to the POSITIVE (+) terminal. Attach the WORK lead (with clamp on end) to the NEGATIVE (—) terminal.

CAUTION: Do not change welding leads while generator is running, as open-circuit voltage (80 volts) is furnished to the terminals. Shut engine down to change leads.

11. Make sure that no loose bars, tools, parts, etc., are in or on any part of engine as they could cause serious damage to or wreckage of engine or generator, or personal injury to anyone standing nearby.

12. Carefully read and follow "Operating Instructions" in your engine operator's manual.

Welding Leads

Table 4-1 shows welding lead sizes recommended for various lengths of leads. The footage shown includes complete welding circuit, both electrode and work leads.

Welding Current Amperes	TOTAL LENGTH OF LEAD CIRCUIT IN FEET (AND METERS) (ELECTRODE LEAD PLUS WORK LEAD)				
	50 Feet (15.2 M)	100 Feet (30.5 M)	150 Feet (45.7 M)	200 Feet (61.0 M)	250 Feet (76.2 M)
100	#4	#4	#2	#1	#1
150	#2	#2	#1	#1/0	#2/0
200	#1	#1	#1/0	#2/0	#3/0
250	#1/0	#1/0	#2/0	#3/0	#4/0
300	#2/0	#2/0	#3/0	#4/0	2 - #2/0
350	#3/0	#3/0	#3/0	2 - #2/0	2 - #3/0
400	#4/0	#4/0	#4/0	2 - #2/0	2 - #3/0

NOTE: Cable size shown is for 90°C (194°F) cable insulation, 30°C (86°F) ambient, and not over 4.5 volts cable drop.

Table 4-1 Suggested Copper Welding Lead Size Guide

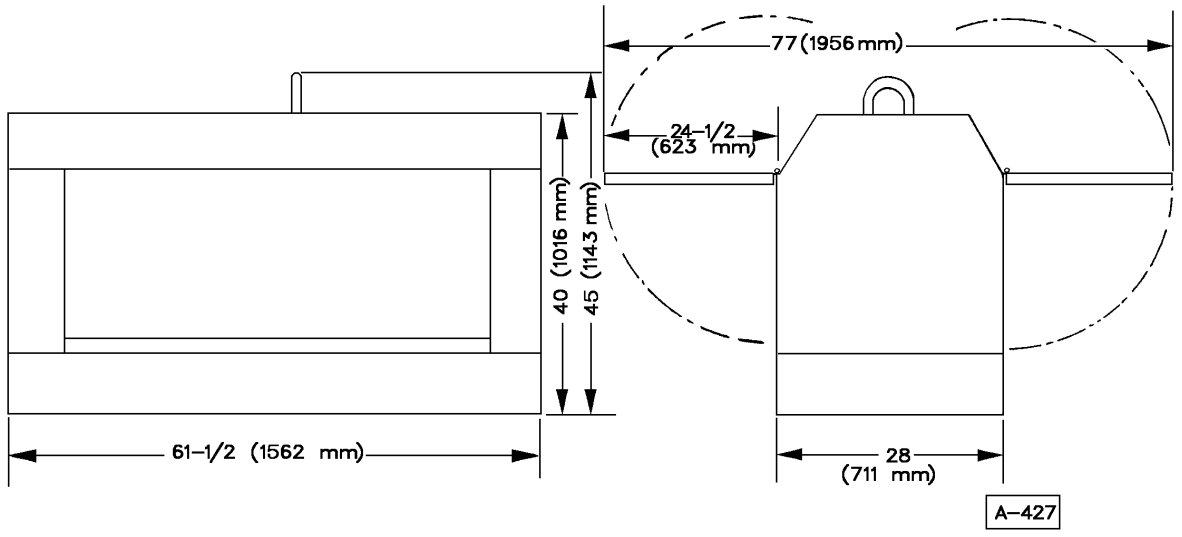


Figure 4-1 Dimensions

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OPERATION

WARNING: MA-4030D mounted on a trailer may develop a "rough" running low idle. Normal idle speed is around 1300 RPM. When mounted on some trailers, the unit will interact with the trailer leaf springs and tires and cause it to run rough. To eliminate, adjust the idle screw on the injection pump (see Figure 5-1) by turning either clockwise or counterclockwise to raise or lower the low idle speed. Be sure, however, not to adjust the low idle below 1000 RPM as the generator will not operate properly.

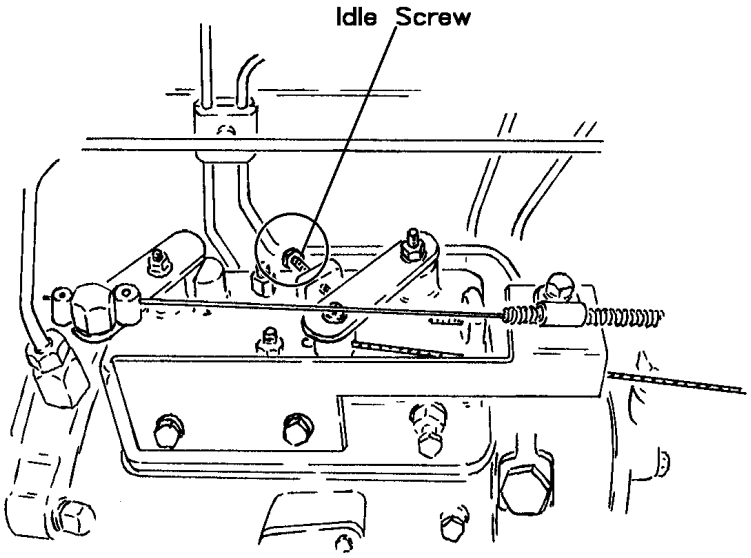


Figure 5-1

Prestarting Instructions

In all probability, the welding unit will be moved from one location to another many times during its lifetime of service. Therefore, reference to Initial Preparation For Use located in Installation chapter is suggested each time the unit is moved prior to using it.

1. Check the supply of fuel, crankcase oil and radiator coolant. See Perkins Engine Handbook for specifications.

2. Inspect the unit thoroughly to be sure it is in proper working order. Check all fuel line and wire connections to be certain they are secure. Tighten any loose screws, nuts or bolts.

3. Wipe off the entire unit and clean the air passages, control box and hard-to-reach places with compressed air not over 25 psi (172 kPa).

4. Make sure that no loose bars, tools, parts, etc., are in or on any part of the engine as they could

cause serious damage to the engine, generator, or personal injury to anyone standing nearby.

5. If the unit is operated indoors, make sure that an exhaust line is properly connected to the engine exhaust system, and discharges out of doors. Avoid short bends or reduction in line size in exhaust pipes, and locate the unit so as to necessitate the shortest possible exhaust line to insure the least amount of back-pressure on the engine. Back-pressure can cause engine damage and loss of power.

6. Attach welding leads, as described under Initial Preparation For Use located in Installation chapter. Observe Table 4-1 and determine that welding leads are proper size for amperage being used for welding.

Break-in Procedures

A proper break-in procedure for a new diesel engine-driven welding generator is extremely important to avoid future problems. *Long periods* of operation at idle or light load condition may result in cylinder wall "glazing" and resultant poor seating of piston rings so that oil consumption will be excessive. Also, it may result in "wet stacking", which is unburned fuel that accumulates in the exhaust pipe due to extremely low exhaust temperatures. The following procedure will apply a load to the engine, assuring the hot exhaust [at least 450°F (232°C)], which will aid in preventing "wet stacking".

1. Open the fuel shut-off valve at fuel tank.

2. Start the engine (see instructions under Engine Controls and Instruments included in Description of Equipment chapter) and let it idle for a *few minutes* to warm up lubricating oil and coolant, and then shut the engine off.

NOTE: Idling RPM is approximately 1300.

3. Check engine for low oil pressure, leaks or malfunctioning parts. If oil pressure does not show a sufficient, steady pressure within 5 seconds, shut engine down and determine cause.

4. Start engine again. Pull throttle control handle all the way OUT. Operate unit with canopy doors *closed*.

NOTE: Covering the radiator partially with cardboard or plywood during this operating period will speed up the engine warm-up. Care must be taken, however, to avoid overheating and boiling the coolant in the radiator.

5. Apply a load to the welding generator. This can be accomplished by attaching a proper resistance load across the welding terminals and setting the current control. The load should be equal to at least one-half of the normal full load output of the unit (rated 300 amps/40 volts).

6. Operate the engine-generator unit for approximately one hour under the above loading conditions.

NOTE: This procedure can be followed at any time that wet-stacking becomes a problem, in order to burn out the unburned hydrocarbons that accumulate in the exhaust stack.

Prewelding Instructions

To adjust weld current and arc characteristics while welding, the High/Low Range Switch, Current Control, and Arc Force Control can all be adjusted under load, without damaging the welding machine. However, caution should be used in switching from low to high range on the Range Selector Switch, as this would cause the welding current to be immediately doubled. This might be more than the electrode in use could stand. This would cause immediate problems with the welding arc.

Note that on the Current Control dial, the low range is just one-half of the high range values. For example, leaving the Current Control setting constant, the high range would deliver 200 amperes, and the low range 100 amperes. This relation holds consistent through the entire range of the welding machine, giving two widely overlapping current ranges. The low range is 15 to 200 amperes, and the high range is 30 to 400 amperes. The entire usable range of the machine for stick electrode (SMAW) welding can be obtained in the single high range.

Adjustable Arc Force control for the welding process gives the operator great flexibility in selecting the arc characteristics needed for a particular job. (Refer to Volt-Amp Curves in Installation chapter.)

Setting the Arc Force Control at 4 to 6, or in the FORCEFUL range will adjust the welding characteristics of the Mega-Arc® 4535D machine to be normal and similar to many of the conventionally controlled engine-driven stick-electrode welding machines. However, turning down the Arc Force Control to the 2 to 4, or SMOOTH range, gives a softer, less "spatter" type of welding arc. Setting the Arc Force Control to DIGGING, 6 to 10 range, gives

a very forceful, driving arc, which makes “sticking” the electrode nearly impossible.

Note on the Volt-Amp Curves that this adjustment of arc characteristics is accomplished by changing the short-circuit-to-welding current ratios as indicated by the dotted lines for arc force settings of 0, 2, 5, and 10 on the dial.

Welding

After all Prestarting and Break-In Procedures have been carried out, the controls for using the gene-rator for welding may be set and welding accomplished. Follow this procedure:

1. Start engine per above instructions. Operate unit with canopy doors *closed.*

2. Set Range Selector Switch on desired range and adjust current control for desired current. Turning the current control clockwise increases the welding current and open-circuit voltage; while turning it counterclockwise decreases the welding current.

3. Strike an arc and begin welding. If a change in welding current is desired, increase by turning knob clockwise until desired current is obtained. See Prewelding Instructions above for details on current range, current level, and arc force control.

Stopping The Engine

1. Stop welding.

2. Push the throttle control handle IN towards the panel as far as it will go.

3. Allow engine to cool sufficiently, then check coolant and crankcase oil level. If engine oil is to be changed, it can be done most effectively while engine is still warm.

> **CAUTION: Use extreme care when removing a radiator cap from an overheated engine. Turn the cap only to the first notch, and allow steam to escape before removing the cap completely.**

4. After engine has cooled completely, fill the fuel tank. See Safety Warnings chapter included in this manual for precautions that should be taken when filling the fuel tank.

Storage

Nightly — After operation, the following steps should be taken before storing the welding machine for short periods of time.

1. Clean up around working area. Put all tools, parts and supplies in their proper places.

2. Disconnect welding leads from machine. Coil them and stow away in their place.

3. If unit is to be stored outdoors, it is wise to cover it with a tarpaulin.

Extensive Storage Time — If unit is to be laid-up for some time, please refer to Withdrawing An Engine From Service, in Maintenance Section of Perkins Handbook for Diesel Engines, which is supplied with each unit.

Adverse Weather Precautions

Cold Weather Operation — Operation of engine-driven welding units at sub-zero temperatures requires special precautions and extra servicing from both operation and maintenance personnel if poor performance or total functional failure is to be avoided. Consult Engine Workshop Manual and recommendations below.

a. Fuel System — Keep system clean and free from water which may collect in a low spot in the fuel line and freeze, plugging the line. Fuel tanks should be kept FULL to prevent water condensation from the air above the fuel. Check the filter bowl daily for presence of water.

b. Fuel — Keep fuel storage tanks or drums as full as possible to avoid condensation of moisture from the air above the fuel. After filling or moving fuel containers, allow fuel to settle before using. Never draw fuel from the extreme bottom of the container. Strain all fuel to remove any foreign matter. When operating outdoors, take steps to prevent the entry of snow, water and ice into the fuel containers.

c. Cooling System — Prior to cold weather, drain ad flush the cooling system to remove accumulations of rust and sediment. Mix and add anti-freeze solution, check the cooling system connections for leaks. Add a can of rust inhibitor to the radiator when system is winterized. This will keep system cleaner and furnish lubrication for the water pump.

d. Lubrication — Drain the crankcase (preferably when warm after running) and fill with a lighter grade of oil. See Engine Oil Recommendations chart in the Maintenance and Operator’s Manual for recommended viscosity oil for various atmospheric temperatures. In cold weather, drain oil more frequently. Water condenses and collects quickly, mixes with the oil and increases deposits to form a sludge. Check oil frequently for this condition. Water

in crankcase or oil lines may freeze and cause serious damage to the oil pump, or shut off the oil supply.

e. Battery — Battery efficiency decreases sharply with lower temperatures. Maintain the specific gravity of the battery between 1.275 and 1.300 (fully charged condition). Make sure of full charge before attempting to start engine in sub-zero conditions.

Operation In Hot And Humid Conditions

a. Cooling System — Elevate welding machine 6 to 8 inches (150 to 200 mm) above floor or ground level to provide adequate circulation of air. Maintain a more frequent check of the coolant level in the radiator.

b. Battery — The specific gravity and proper level of the battery electrolyte should be maintained. Observe recommendations in the Maintenance and Operator's Engine Manual for proper care of the battery.

Operation In Extremely Dusty Conditions — If unit is to be operated under dusty, out-of-door conditions, place in a sheltered area. Take advantage of any natural barriers which may offer protection from blowing dust. If the installation is more than temporary, erect a protection shield.

a. Fuel System — Drain the fuel water-trap sediment bowl frequently, and keep all fuel containers covered and protected against dust entry.

b. Oil Filter and Air Cleaner — These both need more frequent attention under dusty conditions. Check air cleaner daily. Replace oil filter cartridge as needed. Change element in the air cleaner as required.

c. Crankcase — The crankcase oil level will bear close attention. Dusty conditions tend to load crankcase oil with dirt. Watch for dirty and gritty oil conditions, and change oil more frequently as required.

Operation In Salt Water Areas

a. Canopy — Wash canopy regularly to remove salt film. Repaint any damaged places and oil the side panel hinges regularly.

b. Covering — To protect the engine and generator as much as possible from salt water atmosphere, keep the side panels on the canopy closed, when not in use. It is advisable to keep the unit covered with a tarpaulin, if available, while not in operation. Salt water should be wiped from the engine, and all terminals and connections in the electrical system wiped dry. Keep all linkage oiled.

c. Brushes — The brushes of the welding generator and exciter should be inspected regularly to make certain that they are free in the holders. Lift the brushes in the brushholders about every two days, to insure their freedom to slide within the holder. Wipe dry all the parts that can be reached, and use compressed air, if available, to dry the parts of the generator that cannot otherwise be reached. See Maintenance chapter for brush and commutator care.

d. Field Coils — The fields should be dried as thoroughly as possible. If they have become damp, proceed with recommended procedure in Maintenance chapter.

e. Battery Terminals — Thoroughly clean the battery terminals and connections. Coat terminals and connections with petroleum jelly to retard corrosion.

MAINTENANCE

Engine And Related Components

NOTE: Check Detroit Diesel/Perkins Handbook for Diesel Engines for all engine-related maintenance.

Inspection And Cleaning

Every Day, check for oil, coolant, or fuel leaks. Also check for loose electrical connections. Check oil pressure with engine running at rated RPM (1800 RPM). Do not operate engine if oil pressure light stays ON. Wipe accumulated water off all electrical connections and instruments. Make sure that the alternator light is not glowing, which indicates battery is being fully charged.

Every Week, wipe accumulated dust, dirt, and oil off from the engine and generator. Check all parts for looseness and wear. If arcing has occurred at any electrical connection, recondition it and securely refasten. Check engine oil and coolant levels.

Every Month, blow out generator windings with compressed air, not over 25 psi (172 kPa) pressure or remove with a suction type cleaner with a nonmetallic nozzle. If windings should become slightly damp, use space heaters or electric light bulbs to effectively dry out the windings. If dampness is excessive, apply external heat under a canvas cover, well vented. Heating should not exceed 194°F (90°C).

Pound out any dents in the canopy. Sand, prime, or repaint any dented or rusted spots.

Lubrication

Engine — Consult Perkins Handbook for Diesel Engines.

Exciter/Auxiliary Brushes

(See Figure 6-1)

1. Disconnect leads (A) from connectors on brushholder caps (B).

CAUTION: When removing the lead wires, do so one at a time and replace each brush accordingly, to insure that the lead wires are put back onto the proper brushes.

2. Lift brush (D) from brushholder (C) for inspection. If brushes are worn unevenly or are shorter than 7/16 inch (11 mm), replace them.

3. Inspect slip rings whenever brushes are removed for servicing brushes or brushholders. Note surface condition of rings. Surface should appear smooth and clean. Scoring or roughness of slip rings may be caused by grit or abrasive substance in brushes, or by oil on the rings. Moderately rough slip rings can be smoothed by holding grade 00 flint paper against their surface while the rings are revolving slowly. If the rings are badly scored, the unit must be sent to an overhaul facility for repair. After cleaning slip rings, blow dirt and grit out of the unit with compressed air. Do not use over 25 psi (172 kPa) air pressure to blow dirt out.

4. Slip new brushes into brushholder guides, and place caps on top, and screw them into the guides to a “bottomed” position. The spring attached to the brush will determine the pressure at which the brush contacts the slip rings.

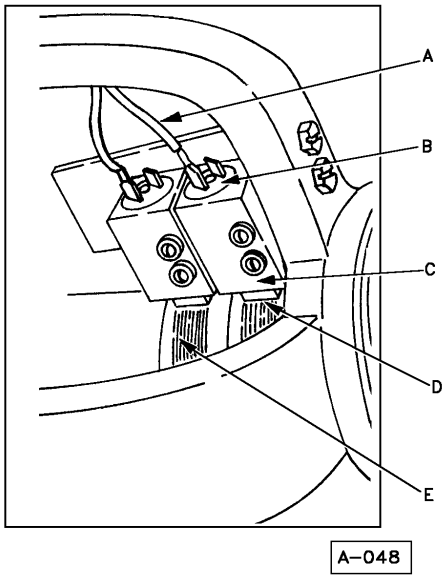


Figure 6-1 Exciter/Auxiliary Brushes

5. To fit new brushes to the slip rings, lay a strip of No. 00 sandpaper, smooth side down, on slip ring surface, and draw the sandpaper in the direction of rotation of the slip rings, lifting the brush on the return stroke. Continue until the brushes have the same curvature as the slip rings. Blow all carbon dust out of the machine using not over 25 psi (172 kPa) air pressure.

Failure To Build Up Voltage

Refer to Connection Diagram in Diagrams chapter included in this manual.

One common problem with engine-driven generators is failure to build up voltage from loss of residual magnetism in the fields.

Check all wiring from the exciter stator T1-T2 to rectifier (CR1) and to slip rings (SR). Also check (CR1) diode bridge for a shorted diode which would not allow unit to build up. If this check does not solve problem, check the revolving fields for continuity, as explained below. See Figure 6-2.

To check for revolving field coil problems, it is necessary to understand that there are two field circuits permanently paralleled at the slip ring connections. A good armature will show 9-ohms resistance measured at the slip rings (with brushes lifted from rings). If the resistance measured at the rings is 12 ohms, then the exciter revolving fields (32-ohm coils) have an open circuit. If the measured resistance at the slip rings is 32 ohms, then the exciter fields (12 ohms) have an open circuit. A resistance measurement of much less than 9 ohms at the slip rings indicates that there is a short circuit somewhere in the revolving field windings.

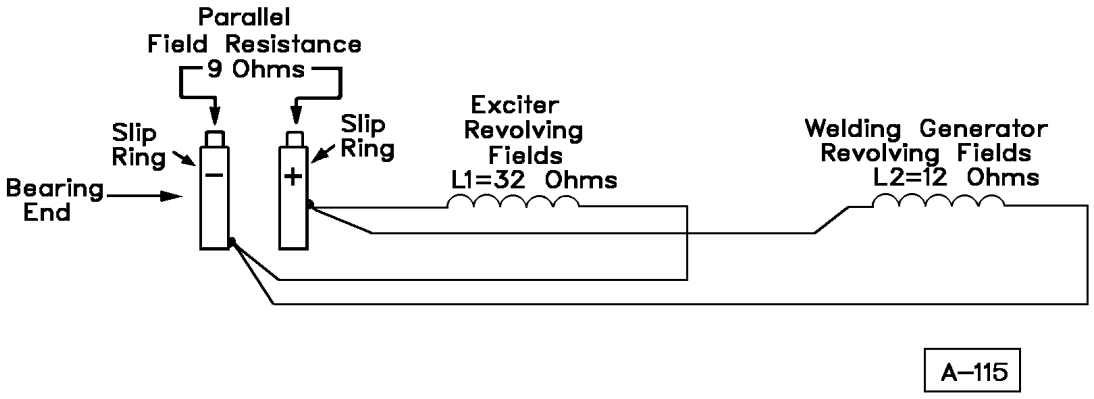


Figure 6-2 Slip Ring Continuity

TROUBLESHOOTING

The following chart contains information which can be used to diagnose and correct unsatisfactory operation or failure of the various components of the welding generator. Each symptom of trouble is followed by a list of probable causes and the procedure necessary to correct the problem.

Troubleshooting Guide

Auxiliary Power Generator (Exciter) and Welding Generator

No output at 115-V and 230-V Receptacles or Welding Terminals (Unit won't build up voltage)

Loose connections.

Check connections completely.

Open circuit in exciter revolving field.

Replace armature (see detail instructions at end of chart).

Brush and slip rings dirty.

Check brushes and clean slip rings.

Broken wiring.

Repair.

Shorted diode in field rectifier bridge.

Replace bridge.

No output at welding terminals (115-V and 230-V receptacle output OK).

Open circuit in welding generator revolving field coils.

Replace armature.

Shorted power diode SCR, or flyback diode in output rectifier assembly.

Replace defective device.

Fuses to control P.C. Board blown.

Replace fuses.

Control P.C. Board failure.

Replace P.C. Board.

Output voltage too high.

Engine overspeeding.

Check engine RPM; should read 1825-1840 (no load).

Output voltage too low.

Engine running underspeed.

Check engine RPM.

One or more revolving field coils shorted.

Replace defective coils.

Engine

See Detroit Perkins Handbook For Diesel Engines.

Detailed Troubleshooting Instructions

The Mega-Arc® 4030D machines are solid-state welding machines. The method of troubleshooting is different, but it is not more difficult than troubleshooting a conventional unit. Do not overlook the obvious. As in the case of all electrical equipment, loose connections are the primary cause of malfunction both internal and external to the power source. Do not overlook bad grounds, shorted control cables, wrong settings, blown fuses, misconnections from auxiliary equipment, misapplications, etc. The only equipment needed to properly detect a problem on this power source is a simple voltohmmeter, although an oscilloscope is the best method to quickly "see" the problem.

Voltages — Refer to proper connection diagram. See Diagram chapter included in this manual.

The following voltages should be read at 1800 RPM engine speed.

1. Welding Generator phase-to-phase, on all three phases — 60 V AC ± 10%.

2. Phase-to-Neutral of Welding Generator — 35 V AC ±10%.

3. Check for blown fuses F3-F8. Refer to Diagram 492107. Between wires 13 brown, 14 orange, 15 grey, 16 black, 17 yellow, and 18 blue on fuse block — 60 V AC ±10%.

NOTE: The ± 10% value indicates the possibility of having a high or low engine RPM.

Malfunction In SCRs Or Diodes — The following conditions will probably exist:

1. One SCR does not turn on (either it is open, or gate signal is not being received by the SCR [gate circuit open]) and a very small change will occur at the welding arc, and will be difficult to detect by the average welding operator. Generally when this happens, it will be necessary to adjust the current control on the front of the power source (see Figure 3-1), increasing the current to obtain the same welding current that was being produced before the SCR defect occurred.

Open-Circuit Voltage Test

If the power source is suspected, a very simple test can tell you a great deal about the power source. Observe the open-circuit voltage of the machine by placing a voltmeter across the output terminals. The voltage reading should be approximately 75 V DC.

If the voltage is not equal or close to 75 V DC, there is something wrong with the power source (welding machine). Note that this voltage was observed at normal engine speed (1800 RPM). It will vary according to the engine speed. If the 75 V DC is observed, there is a very good chance that the power source is operating properly.

NOTE: It is important to note that in the LOW range (15 to 200 amperes) at minimum setting of the Current Control, the open-circuit voltage will drop to a lower value and vary slightly with the current control. This is not a malfunction, but a normal situation.

Power Diode And SCR Testing

In case of a severe malfunction such as a shorted SCR, do NOT turn the unit ON. Disconnect the

leads from the generator to the rectifier assembly, and check with a VOM for shorted SCRs and diodes.

An *open* gate or an *open* SCR cannot be checked with a VOM. If an SCR is not firing, the open-circuit voltage will shift down. Check the following table for typical values for a Mega-Arc® 4030D unit.

	All SCRs Firing	One Not Firing	Two Not Firing	Three Not Firing
Max OCV	75 V DC	50 V DC	25 V DC	0 V DC

Table 7-1

NOTE: The above values in Table 7-1 were recorded at normal engine RPM (1800).

Isolating Malfunctioning SCR

This can be done best by trial-and-error method. Use proper diagram as reference while inspecting the unit.

On the output rectifier heat sink there are three SCRs, each having two small leads. The leads, a white and red one, are connected to a wire harness providing the gate signal to the SCRs.

Turn the Current Control to maximum position (fully clockwise) and begin disconnecting the white leads from the harness, one at a time. As the first lead is disconnected, observe the open-circuit voltage of the machine. If the OCV drops to a lower value, it will indicate that this particular SCR is working properly. Reconnect this lead, and proceed to do the same with the remaining two leads until you discover which disconnection does *not* cause the OCV to drop to a lower level. This will be the SCR which should be changed.

Printed Circuit Board Testing

The next step is to check the Printed Circuit Board inside the unit. See Figure 7-4 and Table 7-2 for location of test points and voltage values at the test points.

The following conditions indicate the possibility of a defective P.C. Board:

1. Loss of welding arc completely.
2. Rough, sputtering arc, very noticeable.
3. Loss of welding arc control.
4. Difficulty in starting arc.

If any voltage measurement does not agree with Table 7-2 voltage values, the P.C. Board is probably defective.

NOTE: Do not attempt to repair or recalibrate these voltages, as they are factory set.

Mounting Procedure for SCRs

1. Thoroughly clean heat sink surface to eliminate any dirt or contamination.

2. Apply a thin coat of Alcoa #2 compound to cleaned surface. Alcoa #2 is available from Thermal Arc, part number 903870.

3. Positively locate the SCR in place in the heat sink. A small spring pin in the extruded heat sink will locate the SCR.

4. Place the clamp in position with the bolts through the holes in the heat sink, and proceed in following manner.

5. Tighten the nuts evenly until finger tight.

6. Tighten each bolt in 1/4 turn increments using correct size hex key.

7. Place the Force Indicator Gauge (903878) firmly against the springs as shown. Be sure both ends and the center are in firm contact with the springs. The gauge notch location will indicate the spring deflection or force. Correct mounting force is indicated as shown below.

8. Spring deflection over 2-1/4 inches of spring is .037" ± .002" for all clamps.

9. All clamps to be set at 4° mark. This corresponds to the VE3000-VE2500 section on the gauge label.

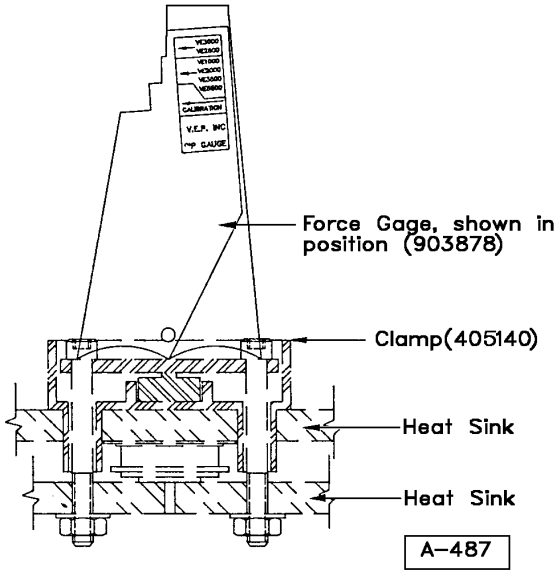
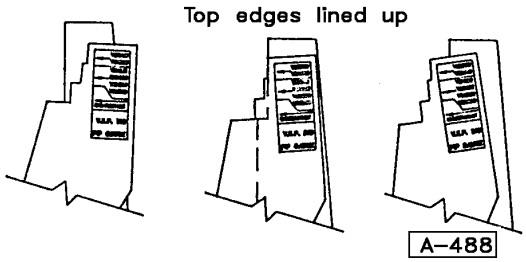


Figure 7-1

Examples:



Less than rated force. Tighten nuts alternately 1/4 turn at a time until points coincide.

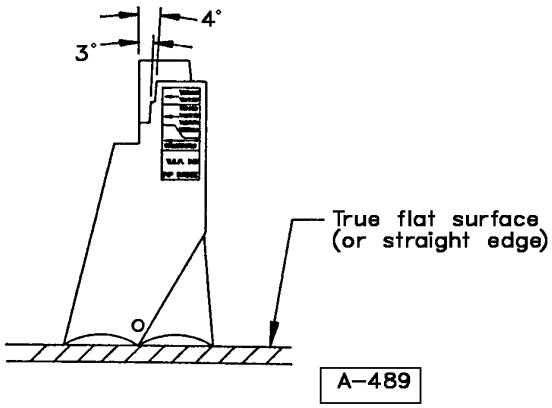
Correct rated force.

Excessive force. Loosen both nuts and start over. Never adjust force by backing off the nuts. Friction will produce a false reading. Always start from Step 1.

Figure 7-2

To Calibrate Force Gauge:

If the gauge is suspected of being out of calibration due to wear or damage, check it on a flat surface as shown below.



If the calibration edges do not line up, calibrate the gauge by filing the bottom contact points.

Figure 7-3

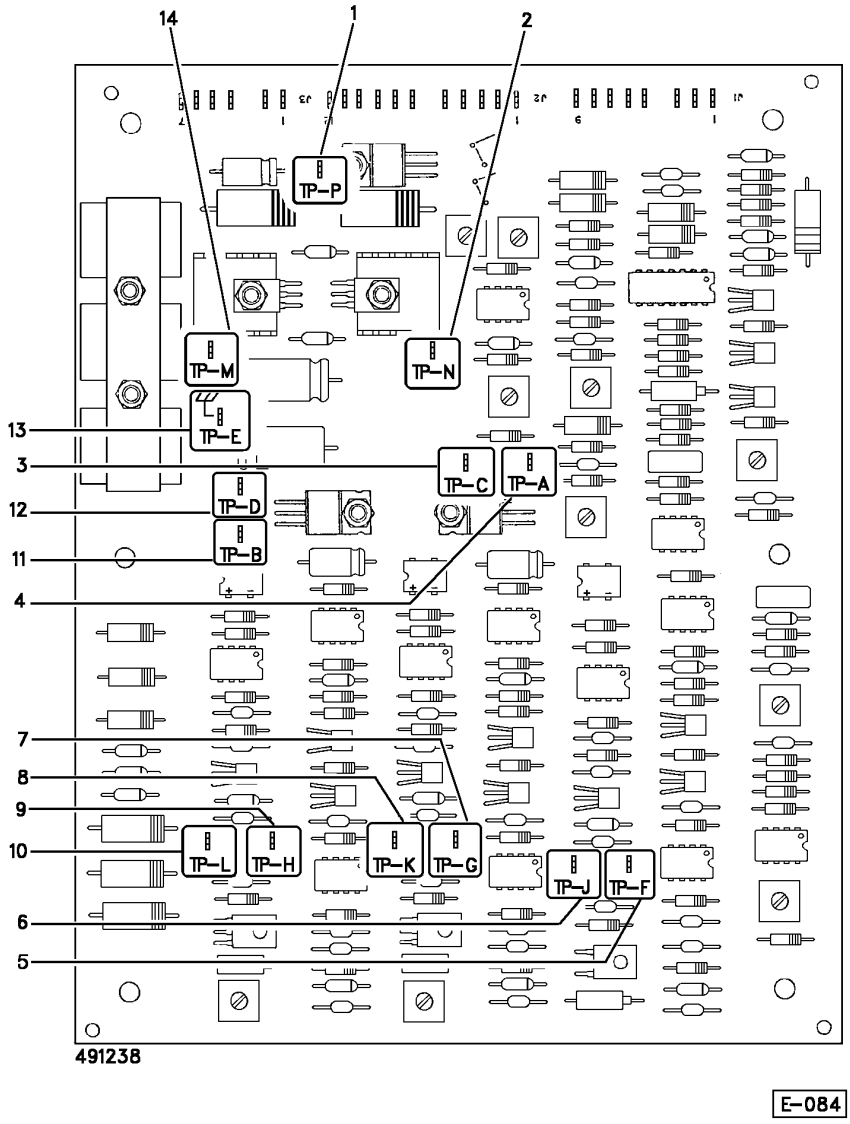


Figure 7-4 Control P.C. Board

TEST	TEST POINTS	CALLOUTS	VOLTAGE	CONDITIONS	REMARKS
1	TP-N to TP-E	2 to 13	+40.0/+21.0	1800 RPM/Idle	No Load
2	TP-M to TP-E	14 to 13	–40.0/–21.0	1800 RPM/Idle	No Load
3	TP-C to TP-E	3 to 13	+20.0	1800 or Idle	No Load
4	TP-D to TP-E	12 to 13	–20.0	1800 or Idle	No Load
5	TP-A to TP-E	4 to 13	+15.0	1800 or Idle	No Load
6	TP-B to TP-E	11 to 13	–15.0	1800 or Idle	No Load
7	TP-F to TP-E TP-G to TP-E TP-H to TP-E	5 to 13 7 to 13 9 to 13	+4.3 +4.3 +4.3	1800 or Idle 1800 or Idle 1800 or Idle	No Load No Load No Load
8	TP-J to TP-E TP-K to TP-E TP-L to TP-E	6 to 13 8 to 13 10 to 13	+18.3 +18.3 +18.3	1800 or Idle 1800 or Idle 1800 or Idle	No Load No Load No Load

Table 7-2

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PARTS LIST

Equipment Identification

All identification numbers as described in the Introduction chapter must be furnished when ordering parts or making inquiries. This information is usually found on the nameplate attached to the equipment. Be sure to include any dash numbers following the Specification or Assembly numbers.

How To Use This Parts List

The Parts List is a combination of an illustration (Figure Number) and a corresponding list of parts which contains a breakdown of the equipment into assemblies, subassemblies, and detail parts. All parts of the equipment are listed except for commercially available hardware, bulk items such as wire, cable, sleeving, tubing, etc., and permanently attached items which are soldered, riveted, or welded to another part. The part descriptions may be indented to show part relationships.

To determine the part number, description, quantity, or application of an item, simply locate the item in question from the illustration and refer to that item number in the corresponding Parts List.

An “Application Code” is used to distinguish parts that are applicable only to certain Specifications and/or Assemblies. This code is found in the rightmost column of the Parts List. If an item in the Parts List applies to all Specifications or Assemblies, the word “ALL” will be in the Application Code column. Refer to the following list to determine the appropriate Application Codes for the Specifications or Assemblies covered by this manual. If only the assembly or specification number is listed, the use of an Application Code does not apply to this manual.

SPEC NUMBER	APPLICATION NUMBER
6298C-1	A
629DC-1	B

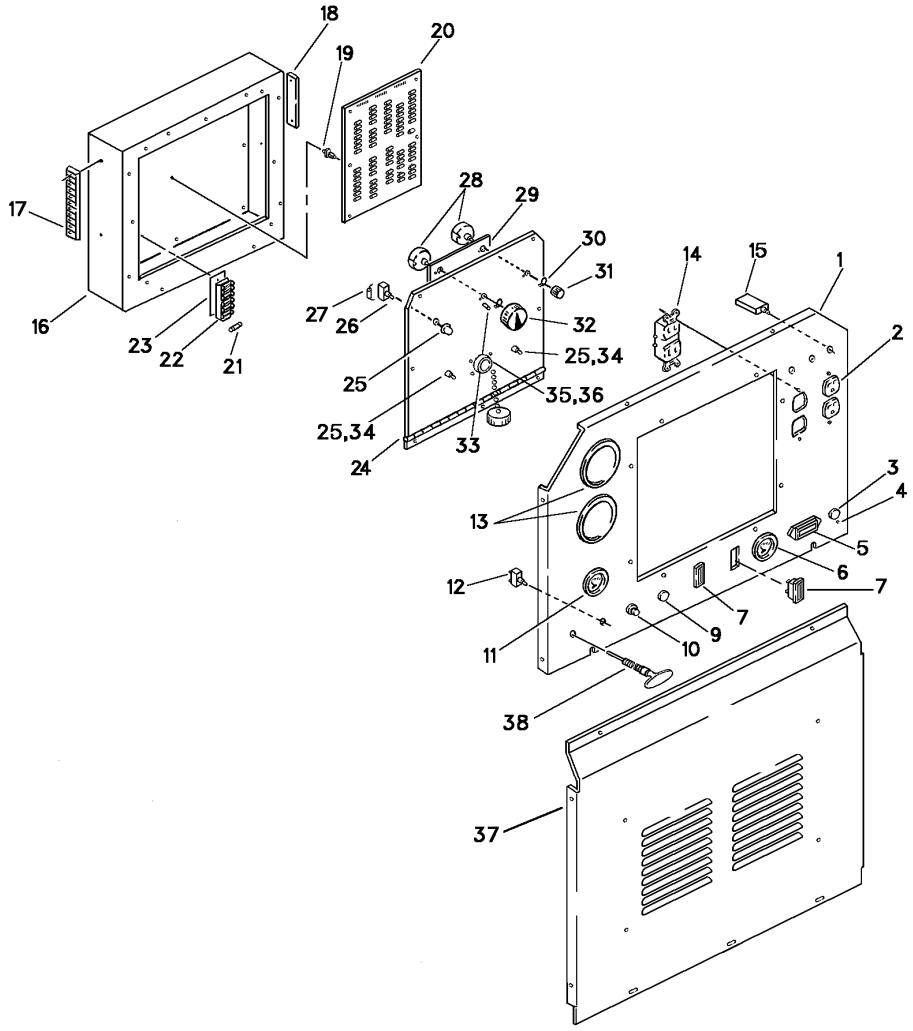

Figure 8-1 Control Panel

Parts List for Figure 8-1

Item No	Part Number	Description	Qty per Assy	Application Code
	494119-4	Panel - Control Assembly	1	A
	494119-7	Panel - Control Assembly	1	
1	494096	. Panel - Control	1	A
	494096-1	. Panel - Control	1	B
2	404089	. Receptacle - Duplex, 3 Wire, 230 V	1	All
3	403091-4	. Plug - Hole, Plastic	1	All
4	403091-12	. Plug - Hole, Plastic	1	All

Parts List for Figure 8-1

Item No	Part Number	Description	Qty per Assy	Application Code
5	79C-1149-1	. Meter - Engine Hour	1	All
6	494150-1	. Gauge - Water Temp.	1	All
7	406004-1	. Light - Snap Mt., Red	2	All
8		Deleted		
9	403091-2	. Plug - Hole, Plastic	1	All
10	30GH-1119	. Switch - Pushbutton	1	All
11	494134-1	. Gauge - Fuel	1	All
12	404856	. Switch - Toggle, DPDT, MOM, ON	1	All
13	405982-1	. Cover - Hole, Meter	2	All
14	402670	. Receptacle - Duplex, 3 Wire 115 V	1	All
15	409527-3	. Circuit Breaker - Thermal	3	All
	492010-2	. Box - Control, Assembly	1	A
	492010-8	. Box - Control, Assembly	1	B
16	492036	. . Box - Control	1	A
	492036-1	. . Box - Control	1	B
17	406003-2	. . Strip - Terminal Q.C., 12 Station	1	All
18	406003-1	. . Strip - Terminal Q.C., 6 Station	1	All
19	404915-1	. . Spacer - P.C. Board	6	All
20	491238	. . Board - P.C. Control Assembly	1	All
21	W-11166-9	. . Fuse - 1 Amp, Fast Blow	6	All
22	405129-1	. . Block - Fuse	1	All
23	367579	. . Insulator - Fuse Block	1	All
—	405157	. . Label - Fuse	1	All
	491454	. . Door - Control Box Assembly	1	A
	491454-1	. . Door - Control Box Assembly	1	B
24	491446	. . . Door - Assembly	1	A
	491446-1	. . . Door - Assembly	1	B
25	406040	. . . Boot - Toggle Switch	3	All
26	405365-1	. . . Switch - Toggle, SPST	1	All
27	367703-1	. . . Resistor - 1/2 Watt Assembly	1	All
28	406926-1	. . . Potentiometer - 2 Watt, 5 K	2	All
29	492576	. . . Board - Mtg. Pot.	1	All
30	402663	. . . Nut - Pot. Lock	2	All
31	406806-1	. . . Knob - Control	1	A
	406806-3	. . . Knob - Control	1	B
32	491773-1	. . . Knob - Control	1	A
	491773-3	. . . Knob - Control	1	B

— Not Illustrated

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Parts List for Figure 8-1

Item No	Part Number	Description	Qty per Assy	Application Code
33	8BW-106A	. . . Spacer	1	All
34	402682	. . . Switch - Toggle	2	All
35	400758	. . . Receptacle - 6 Pin Amphenol	1	All
36	404875	. . . Cap & Chain - Assembly	1	All
37	494097	Panel - Rear, Lower	1	A
	494097-1	Panel - Rear, Lower	1	B
38	DW-4333	Rod - Throttle	1	All

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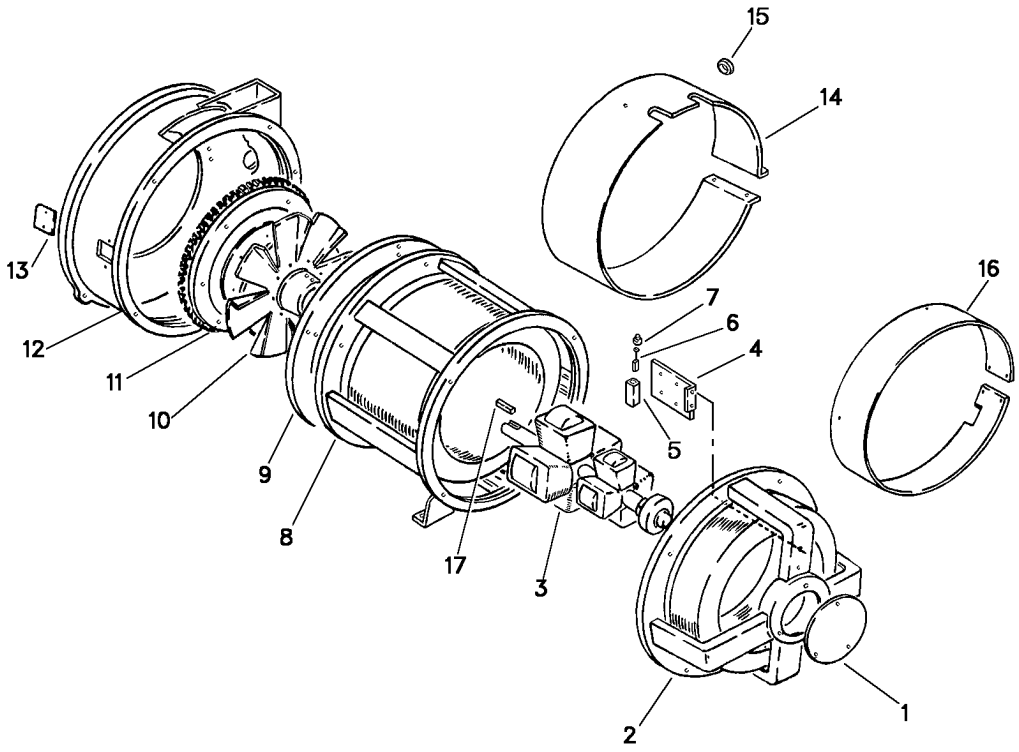

Figure 8-2 Frame Group

Parts List for Figure 8-2

Item No	Part Number	Description	Qty per Assy	Application Code
	491461-2	Generator - Assembly	1	A
	491461-6	Generator - Assembly	1	B
1	5J-260-0	. Cap - Bearing	1	A
	5J-260-3	. Cap - Bearing	1	B
2	356773-38	. Housing - Exciter, Assembly	1	All
3	491897	. Armature	1	All
	491464	. Brushholder - Assembly	1	All
4	491463	. . Bracket - Brushholder	1	All
5	402530	. . Guide - Brushholder	2	All
6	402788	. . Brush	2	All
7	402531	. . Cap - Brushholder	2	All
8	356773-42	. Housing - Gen. Assembly	1	All
9	491784	Ring - Adapter	1	All
10	491658-1	Fan & Coupling - Assembly	1	All
11	No Number	Flywheel - (Supplied W/Engine)	1	All
12	492300-2	Housing - Flywheel	1	All
13	491758-1	Cover - Hole, Flywheel Housing	1	A
	491758-3	Cover - Hole, Flywheel Housing	1	B
14	491813	Cover - Gen. Housing	1	A
	491813-1	Cover - Gen. Housing	1	B
15	351683	Grommet - Lead Hole	2	All
16	491479	Cover - Exc. Housing	1	A
	491479-1	Cover - Exc. Housing	1	B
17	C-31	Key - Coupling	1	All

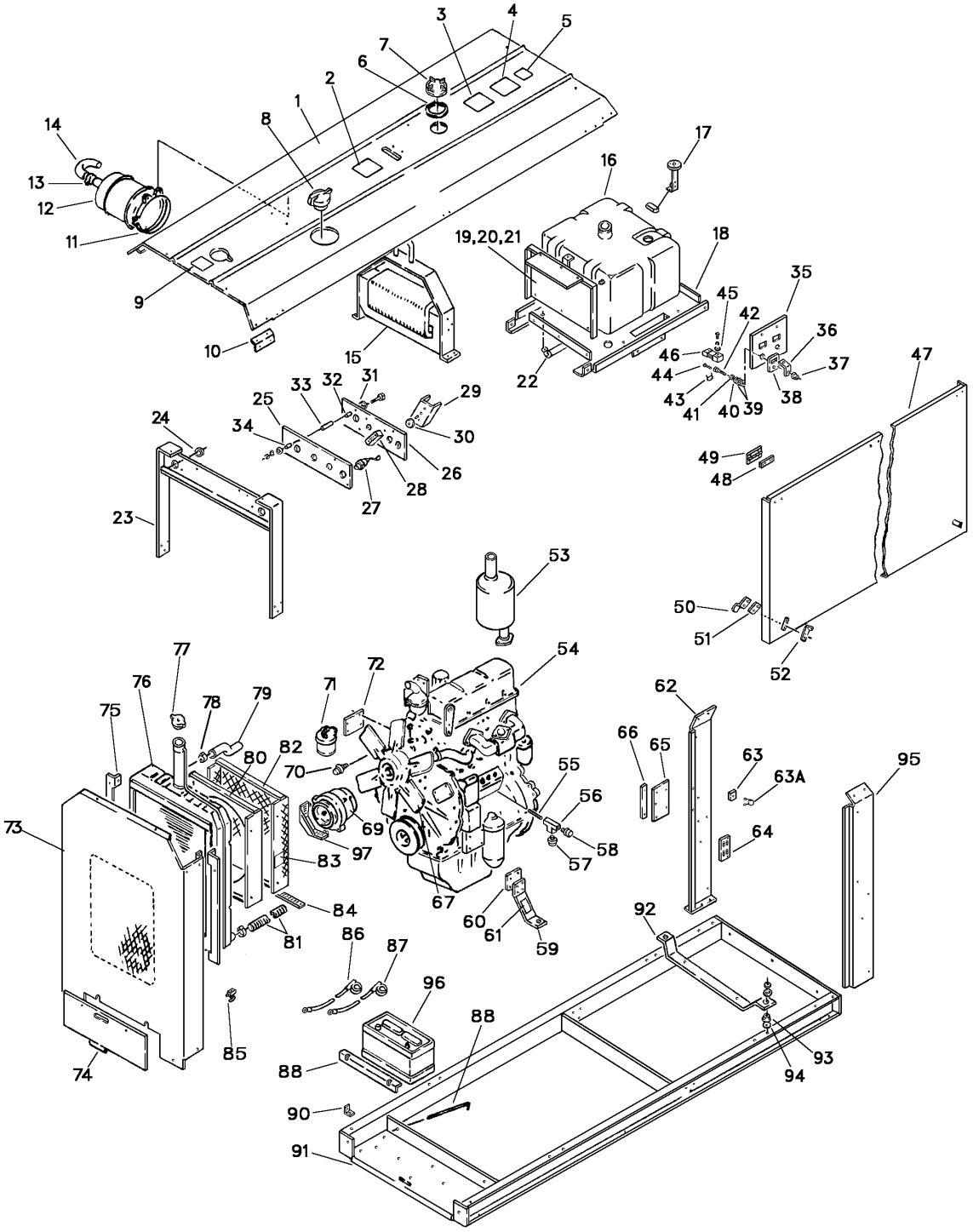

Figure 8-3 Generator Group

Parts List for Figure 8-3

Item No	Part Number	Description	Qty per Assy	Application Code
1	492364-1	Top - Canopy	1	A
	492364-3	Top - Canopy	1	B
2	409158	Label - Danger	1	All
3	405089	Label - Fuel	1	All
4	406000	Label - Warning, Fuel	1	All
5	494445	Label - Precautionary	1	All
6	494130	Shield - Safety	1	All
7	494133	Cap - Fuel Tank	1	All
8	DDW-495-8	Cap - Rain	1	All
9	407366	Label	1	All
10	359699	Brace - Canopy	2	A
	359699-1	Brace - Canopy	2	B
11	406187	Bracket - Mtg. Air Cleaner	2	All
12	406927	Cleaner - Air	1	All
13	W-10869-3	Clamp - Hose	2	All
14	406945	Hose - Air Cleaner	1	All
15	491414	Reactor - Stability Assembly	1	All
16	494127	Tank - Fuel	1	All
17	494135-1	Sender - Fuel Gauge	1	All
18	494139	Support - Fuel Tank	1	A
18	494139-1	Support - Fuel Tank	1	B
19	492191	Panel - Heat Shield	1	A
	492191-1	Panel - Heat Shield	1	B
20	491820	Support - Heat Shield	1	A
	491820-1	Support - Heat Shield	1	B
21	492195	Cover - Heat Shield	1	All
22	406358-2	Resistor - Preload	1	All
23	494456	Yoke - Lifting, Assembly	1	A
	494456-1	Yoke - Lifting, Assembly	1	B
24	402037-11	Grommet - Lifting Yoke	2	All
	492368-1	Rectifier - Output	1	All
25	482367-1	. Plate - Rect. Output, Right	1	All
26	492366	. Plate - Rect. Output, Left	1	All
27	W-10931-3	. Rectifier - Silicon Controlled	4	All
28	405140-1	. Clamp - Mounting	3	All
29	492413	. Heat Sink - SCR	3	All
—	Not Illustrated			

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Parts List for Figure 8-3

Item No	Part Number	Description	Qty per Assy	Application Code
30	405826	. Rectifier - Silicon Controlled	3	All
—	16DA-954-12	. Pin - Spring	3	All
31	494459-1	. Spacer - Insulating	2	All
32	410223-6	. Tubing - Fiber	2	All
33	494459-8	. Spacer - Insulator	2	All
34	494459-2	. Spacer - Insulator	2	All
	492533-3	Panel - Terminal Assembly	1	A
	492533-6	Panel - Terminal Assembly	1	B
35	492532-1	. Panel - Output Weld	1	A
	492532-2	. Panel - Output Weld	1	B
36	5CW-974	. Bar - Bus	2	All
37	No Number	. Nut - 1/2-13, HWH, ST.	2	All
38	5CW-975	. Bushing - Insulator	2	All
39	5CW-976A	. Washer - Insulating	4	All
40	No Number	. Washer - 1/2 FL. ST.	2	All
41	No Number	. Washer - 1/2 LK. ST.	5	All
42	351505	. Screw - 1/2-13 x 1-3/4	2	All
43	368705-7	. Capacitor - Assembly	2	All
44	No Number	. Screw - #6-30 x 3/16 Rd. Hd. MH.	2	All
45	No Number	. Washer - 1/2 FL. ST.	3	All
46	367687	. Shunt	1	All
—	W-9234-338	Cable - Output Term. to Rect.	1	All
—	W-9234-339	Cable - Output Term. to Reactor	1	All
47	491763-1	Door - Side	2	A
	491763-3	Door - Side	2	B
48	490174	Plate - Hinge	12	All
49	490040	Hinge - Door	6	All
50	490234	Latch - Door	4	All
51	493457	Spacer - Latch	4	All
52	492244	Handle - Door Latch	4	All
53	406155	Muffler	1	All
54	406080	Engine - Diesel	1	All
55	W-10750-2	Nipple - Pipe	1	All
56	W-10910-0	Tee - Pipe, 1/8	1	All
57	402130	Switch - Oil Pressure	1	All
58	409159	Switch - Oil Pressure	1	All
—	494824	Spacer - Fan	1	All
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Parts List for Figure 8-3

Item No	Part Number	Description	Qty per Assy	Application Code
59	491673-1	Support - Engine	2	A
	491673-2	Support - Engine	2	B
60	491672	Spacer - Mtg. Engine	2	A
	491672-1	Spacer - Mtg. Engine	2	B
61	406178	Label - Oil Filter	1	All
62	494128	Panel - Side, Right	1	A
	494128-1	Panel - Side, Right	1	B
63	409554-1	Rectifier - Assembly	1	All
63A	202258-5	Suppressor - W/Lugs	1	All
64	367634A-5	Suppressor - Surge Assembly	1	All
65	492049	Bracket - Mtg. Bus Bar	1	All
66	492047	Bar - Bus	1	All
—	403618-7	Belt - Fan	1	All
67	406149	Fan - Engine	1	All
68	Deleted			
69	494181	Alternator - Delco	1	All
—	W-9360-229	Cable - Bonding	1	All
70	494149-2	Sender - Water Temp.	1	All
71	No Number	Filter - Fuel (Supplied W/Engine)	1	All
72	491721-1	Bracket - Mtg. Fuel Filter	1	A
	491721-2	Bracket - Mtg. Fuel Filter	1	B
73	492362-1	Panel - Front	1	A
	492362-3	Panel - Front	1	B
74	491689-1	Plate - Front End	1	A
	491689-23	Plate - Front End	1	B
75	491690-1	Support - Radiator	2	A
	491690-2	Support - Radiator	2	B
76	406981-1	Radiator	1	All
77	406989	Cap - Radiator	1	All
78	W-10869-12	Clamp - Hose	4	All
79	406977	Hose - Radiator, Top	1	All
80	493252-1	Shroud - Fan	1	A
	493252-2	Shroud - Fan	1	B
81	405977-2	Hose - Radiator Bottom	1	All
82	494741	Guard - Fan	1	All
83	406001	Label - Caution	2	All
84	494725	Brace - Guard	1	All
85	5CW-1932-0	Block - Drain	1	All
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Parts List for Figure 8-3

Item No	Part Number	Description	Qty per Assy	Application Code
86	492133-4	Cable - Batt. Pos.	1	All
87	492132-3	Cable - Batt. Neg.	1	All
88	491962-1	Clamp - Battery	1	A
	491962-2	Clamp - Battery	1	B
89	494295	Rods - Battery	2	All
90	491122	Angle - Mtg. Front Panel	2	A
	491122-1	Angle - Mtg. Front Panel	2	B
91	491680-1	Frame - Mounting	1	A
	491680-1	Frame - Mounting	1	B
92	491683-1	Bar - Mtg. Gen.	1	A
	491683-2	Bar - Mtg. Gen.	1	B
93	406254-3	Mount - Shock	4	All
94	491799	Washer - Shock	8	A
	491799-1	Washer - Shock	8	B
95	494129	Panel - Side, Left	1	A
	494129-1	Panel - Side, Left	1	B
96	402086-2	Battery	1	All
—	493797-2	Protector - Batt. Term.	1	All
—	357013	Clamp - Throttle Rod	1	All
97	494730	Guard - Alternator	1	All

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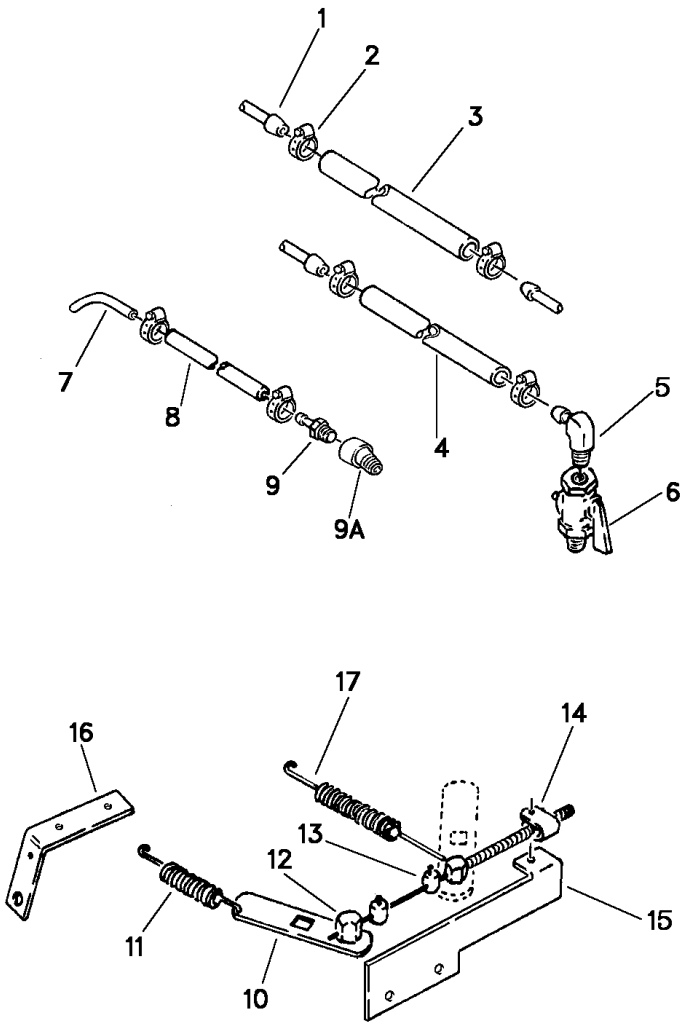

Figure 8-4 Fuel Lines and Speed Control

Parts List for Figure 8-4

Item No	Part Number	Description	Qty per Assy	Application Code
	492288-1	Line - Fuel & Return	1	All
1	490036	. Line - Fuel	1	All
2	W-10869-14	. Clamp - Hose	6	All
3	355325-10	. Hose - Rubber	1	All
4	355325-16	. Hose - Rubber	1	All
5	405091-1	. Elbow - Male, Barbed	1	All
6	402265	. Valve - 1/4 Turn, Shut Off	1	All
7	492075	. Line - Return	1	All
8	491889-4	. Hose - Rubber	1	All
9	402927-1	. Adapter - Tube to Pipe	1	All
9A	12CW-2125	. Elbow - Street, 45°	1	All
		Speed Control Section		
10	490186	Arm - Fuel Shut-Off	1	All
11	400562-32	Spring	1	All
12	490028	Pivot - Throttle	2	All
13	16DW-34	Bushing - Throttle	2	All
14	494541	Clamp - Throttle Rod	1	All
15	490010	Support - Throttle Rod	1	A
	490010-1	Support - Throttle Rod	1	B
16	492360	Bracket - Spring	1	A
	492360-1	Bracket - Spring	1	B
17	W-799F-110	Spring	1	All
—	490073	Bracket - Spring	1	A
—	490073-1	Bracket - Spring	1	B

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EAST PENN manufacturing co., inc.

LEAD RETURN RECYCLE

- Material Safety Data Sheet -
BATTERY ELECTRIC STORAGE, DRY

SECTION I

Manufacturer's Name:
East Penn Manufacturing Co. Inc.
Deka Road, Lyon Station, PA 19536

Date Prepared: Revised April 1994

Telephone Number for Information: (610) 682-6361

Emergency Telephone Number: **CHEMTREC:** 1-800-424-9300,
In Washington D.C. or outside continental U.S., call 1-202-483-7616

SECTION II
HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components Specific Chemical Identity (Common Name(s)	OSHA PEL	ACGIH TLV	Other Limits Recommended	Percent
Lead and Lead Components	0.050 mg/m^3	0.15 mg/m^3	N/A	97

SECTION III
PHYSICAL/CHEMICAL CHARACTERISTICS

Appearance and Odor: N/A

Solubility in Water: N/A

Boiling Point: N/A

Specific Gravity (H_2O=1): N/A

Evaporation Rate (Butyl Acetate=1): N/A

Vapor Density (AIR=1): N/A

Melting Point: N/A

Vapor Pressure (mm Hg.): N/A

SECTION IV
FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): N/A **Flammable Limits:** N/A **LEL:** N/A **UEL:** N/A

Extinguishing Media: Dry chemical, carbon dioxide, water spray or foam

Special Fire Fighting Procedures: N/A **Unusual Fire and Explosion Hazards:** N/A

SECTION V
REACTIVITY DATA (Battery Case)

Stability: Stable **Conditions to Avoid:** N/A **Incompatibility (Material to Avoid):** N/A

Hazardous Decomposition of By-Products: N/A **Hazardous Polymerization:** will not occur

SECTION VI
HEALTH HAZARD DATA

Route(s) of Entry: No applicable under normal use

Health Hazards (acute and chronic): Internal components contain lead. Repeated or prolonged exposure to lead can result in lead poisoning. Lead accumulates in the bone and body organs and is eliminated from the body slowly. (Ref: 29 CFR 1910.1025)

Carcinogenicity: N/A
IARC Monographs: Group 2B carcinogen
OSHA Regulated: 29CFR1910.1025

Medical Conditions Generally Aggravated by Exposure: Pregnant women and children must be protected from lead exposure.

Signs and Symptoms of Exposure:
Short term: Skin and eye irritation, headache, nausea, vomiting, abdominal spasms, fatigue, weight loss, anemia, pain in legs, arms, and joints.

Long term: CNS damage, kidney disfunctions and potential reproductive hazard. Symptoms of lead exposure can be confirmed by the presence of elevated levels of lead in blood.

Emergency and First Aid Procedures: Not applicable under normal use. If lead exposure is suspected, seek medical attention.

SECTION VII
PRECAUTIONS FOR SAFE HANDLING AND USE - Not Applicable

Steps to be Taken in Case Material is Released or Spilled: Avoid contact with internal components. (See Section VI Health Hazards: Lead)

Waste Disposal Method: Lead acid batteries are completely recycable. For information on returning batteries to East Penn for recycle, call (610) 682-6361.

Precautions to be Taken in Handling and Storing: N/A **Other Precautions:** N/A

SECTION VIII
CONTROL MEASURES - not applicable under normal use

Respiratory Protection (Specific Type): For specific information see 29CFR 1910.1025, Lead Exposure

Ventilation: Local exhaust:
Mechanical (general):
Special:
Other:

Protective Gloves: N/A

Eye Protection: N/A

Other Protective Clothing or Equipment: N/A

Work/Hygienic Practices: Always practice good personal hygiene habits and safe work practices.

TRANSPORTATION
NOTE:

Shipping Name: Battery, dry

Identification Number: N/A, non-assigned

Hazard Class: N/A. This article is not applicable to 49CFR 172.101 Hazardous Materials and not subject to Parts 170-189 of this sub chapter.

U.S. Postal Service Regulations: unrestricted

EAST PENN manufacturing co., inc.

LEAD RETURN RECYCLE

- Material Safety Data Sheet -
BATTERY WET, FILLED WITH ACID
8 UN2794 PGIII

SECTION I

Manufacturer's Name:
East Penn Manufacturing Co. Inc.
Deka Road, Lyon Station, PA 19536

Date Prepared: Revised April 1994

Telephone Number for Information: (610) 682-6361

Emergency Telephone Number: **CHEMTREC:** 1-800-424-9300,
In Washington D.C. or outside continental U.S., call 1-202-483-7616

SECTION II
HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components Specific Chemical Identity (Common Name(s)	OSHA PEL	ACGIH TLV	Other Limits Recommended	Percent
Lead, CAS #7439921	0.05 mg/m^3	0.15 mg/m^3	N/A	43-70
Sulfuric Acid, CAS #7664939	1.00 mg/m^3	1.00 mg/m^3	N/A	20-44
Antimony, CAS #7440360	0.50 mg/m^3	0.50 mg/m^3	N/A	0-4

SECTION III
PHYSICAL/CHEMICAL CHARACTERISTICS (Sulfuric Acid)

Appearance and Odor: clear, odorless, colorless
Boiling Point: approximately 235°F
Evaporation Rate (Butyl Acetate=1): less than 1.0
Melting Point: N/A
Solubility in Water: completely
Specific Gravity (H_2O=1): 1.220-1.325
Vapor Density (AIR=1): N/A
Vapor Pressure (mm Hg.): 13

SECTION IV
FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): non-flammable
Extinguishing Media: Class ABC extinguisher, CO_2 and/or Halon
Flammable Limits: *hydrogen gas **LEL:** 4% **UEL:** 74%

Special Fire Fighting Procedures: Cool exterior of battery if exposed to fire to prevent rupture. The acid mist and vapors in a fire situation are corrosive. Wear special respiratory protection (SCBA) and clothing.

Unusual Fire and Explosion Hazards: *Hydrogen gas, which may explode if ignited, is produced by this battery, especially when charging. Use adequate ventilation, avoid open flames, sparks, or other sources of ignition.

SECTION V
REACTIVITY DATA (Battery Case)

Stability: Stable
Condition to Avoid: Cases decompose at 160-410°C (322-770°F)

Incompatibility (Materials to Avoid): Strong oxidizing agents such as hot nitric acid, etc.

Hazardous Decomposition of By-Products: Combustion can produce carbon dioxide (CO^2) and carbon monoxide (CO).

Hazardous Polymerization: will not occur
Conditions to Avoid: not applicable

SECTION VI
HEALTH HAZARD DATA (Sulfuric Acid)

Route(s) of Entry: Inhalation, skin contact, and ingestion

Health Hazards (Acute and Chronic): Short term exposure: Sulfuric acid may cause irritation of eyes, nose, and throat. Prolonged contact may cause severe burns. Long term exposure: Repeated contact causes irritation and skin burns. Repeated exposure to mist may cause errosion of teeth, chronic eye irritation and/or chronic inflammation of the nose, throat, and bronchial tubes.

TARGET ORGAN: respiratory system, eyes, skin, & teeth **Carcinogenicity:** N/A

Signs and Symptoms of Exposure: Acid contact may cause irritation of eyes, nose and throat. Breathing of mist may produce respiratory difficulty. Contact with eyes and skin causes irritation and skin burns. Sulfuric acid is a **CORROSIVE** chemical.

Medical Conditions Generally Aggravated by Exposure: Pulmonary edema, bronchitis, emphysema, dental errosion, and traceobronchitis

Emergency and First Aid Procedures:

1) Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention.

2) If swallowed, give large volumes of water. **DO NOT** induce vomiting, obtain medical treatment.

3) Eyewash and shower stations should be made available.

SECTION VII
PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released or Spilled: SULFURIC ACID: Dilute spill cautiously with five to six volumes of water and gradually neutralize with sodium bicarbonate, soda ash or lime. When exposure level is not known, wear NIOSH approved positive pressure self-contained breathing apparatus. (Reference DOT UN2796)

Waste Disposal Method: Lead-acid batteries are completely recyclable. For information on returning batteries to East Penn for recycling, call (610) 682-6361.

Precautions to be Taken in Handling and Storing: Store away from reactive material as defined in Section V, Reactivity Data.

Other Precautions: Sodium bicarbonate, soda ash, sand, or lime should be kept in same general area for emergency use. See Section IV on generation of hydrogen gas. If battery case is broken, avoid direct contact with internal components.

SECTION VIII
CONTROL MEASURES

Respiratory Protection (Specific Type): Acid gas respirator required when PEL is exceeded or employee witnesses respiratory irritation. (See Section VI, Health Hazard Data).

Ventilation: Must be provided when charging in an enclosed area. 29CFR1910.178(g) and .305(j)(7)

Mechanical (general): acceptable at 1 to 4 air exchanges/hour or to maintain air concentrations below the PEL.
Local exhaust: preferred
Special:
Other: local building/fire codes may require explosion proof fans and equipment

Protective Gloves: acid resistant (for example, rubber)
Eye Protection: preferred
Other Protective Clothing or Equipment: acid resistant aprons, boots, and protective clothing

Work/Hygienic Practices: Good personal hygiene and work practices are mandatory.

EAST PENN manufacturing co., inc.

LEAD RETURN RECYCLE

- Material Safety Data Sheet -
BATTERY FLUID ACID
8 UN2796 PGII

SECTION I

Manufacturer's Name:
East Penn Manufacturing Co. Inc.
Deka Road, Lyon Station, PA 19536

Date Prepared: Revised April 1994

Telephone Number for Information: (610) 682-6361

Emergency Telephone Number: **CHEMTREC:** 1-800-424-9300,
In Washington D.C. or outside continental U.S., call 1-202-483-7616

SECTION II

HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components Specific Chemical Identity (Common Name(s)	OSHA PEL	ACGIH TLV	Other Limits Recommended	Percent
Sulfuric Acid, CAS #7664939	1.00 mg/m^3	1.00 mg/m^3	N/A	30

SECTION III

PHYSICAL/CHEMICAL CHARACTERISTICS (Sulfuric Acid)

Appearance and Odor: clear, odorless, colorless
Boiling Point: approximately 235°F
Evaporation Rate (Butyl Acetate=1): less than 1.0
Melting Point: N/A
Solubility in Water: completely
Specific Gravity (H_2O=1): 1.220-1.325
Vapor Density (AIR=1): N/A
Vapor Pressure (mm Hg.): 13

SECTION IV

FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): non-flammable
Extinguishing Media: N/A
Flammable Limits: N/A
LEL: **UEL:**

Special Fire Fighting Procedures: Sulfuric acid will not burn but is capable of igniting finely combustible material on contact. Combustibles may be smothered by dry chemical extinguishing media.

Unusual Fire and Explosion Hazards: NFPA ratings: H=3, F=0, R=2

SECTION V

REACTIVITY DATA (Battery Case)

Stability: Stable

Condition to Avoid: Contact with metal may release explosive hydrogen gas.

Incompatibility (Materials to Avoid): Strong alkali materials, carbides, chlorates, nitrates, and pierates, organic acid, acetates, anhydrites.

Hazardous Decomposition of By-Products: Thermal decomposition or combustion may produce a sulfur trioxide and/or sulfur dioxide.

Hazardous Polymerization: will not occur

SECTION VI
HEALTH HAZARD DATA (Sulfuric Acid)

Route(s) of Entry: Inhalation, skin contact, and ingestion **Carcinogenicity:** N/A

Signs and Symptoms of Exposure: Acid contact may cause irritation of eyes, nose and throat. Breathing of mist may produce respiratory difficulty. Contact with eyes and skin causes irritation and skin burns. Sulfuric acid is a **CORROSIVE** chemical.

Medical Conditions Generally Aggravated by Exposure: Pulmonary edema, bronchitis, emphysema, dental errosion, and traceobronchitis

Health Hazards (Acute and Chronic):
Short term exposure: Sulfuric acid may cause irritation of eyes, nose, and throat. Prolonged contact may cause severe burns.

Long term exposure: Repeated contact causes irritation and skin burns. Repeated exposure to mist may cause errosion of teeth, chronic eye irritation and/or chronic inflammation of the nose, throat, and bronchial tubes.

TARGET ORGAN: respiratory system, eyes, skin, & teeth

Emergency and First Aid Procedures:

1) Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention.

2) If swallowed, give large volumes of water. **DO NOT** induce vomiting, obtain medical treatment.

3) Eyewash and shower stations should be made available.

SECTION VII
PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released or Spilled: Dilute spill cautiously with five to six volumes of water and gradually neutralize with sodium bicarbonate, soda ash, or lime. When exposure level is not known, wear NIOSH approved positive pressure self-contained breathing apparatus. (Reference DOT UN2796)

Waste Disposal Method: Neutralize and dispose in accordance with local, state, and federal regulations.

Precautions to be Taken in Handling and Storing: Store away from reactive material as defined in Section V, Reactivity Data.

Other Precautions: Sodium bicarbonate, soda ash, sand, or lime should be kept in same general area for emergency use.

SECTION VIII
CONTROL MEASURES

Respiratory Protection (Specific Type): Acid gas respirator required when PEL is exceeded or employee witnesses respiratory irritation. (See Section VI, Health Hazard Data).

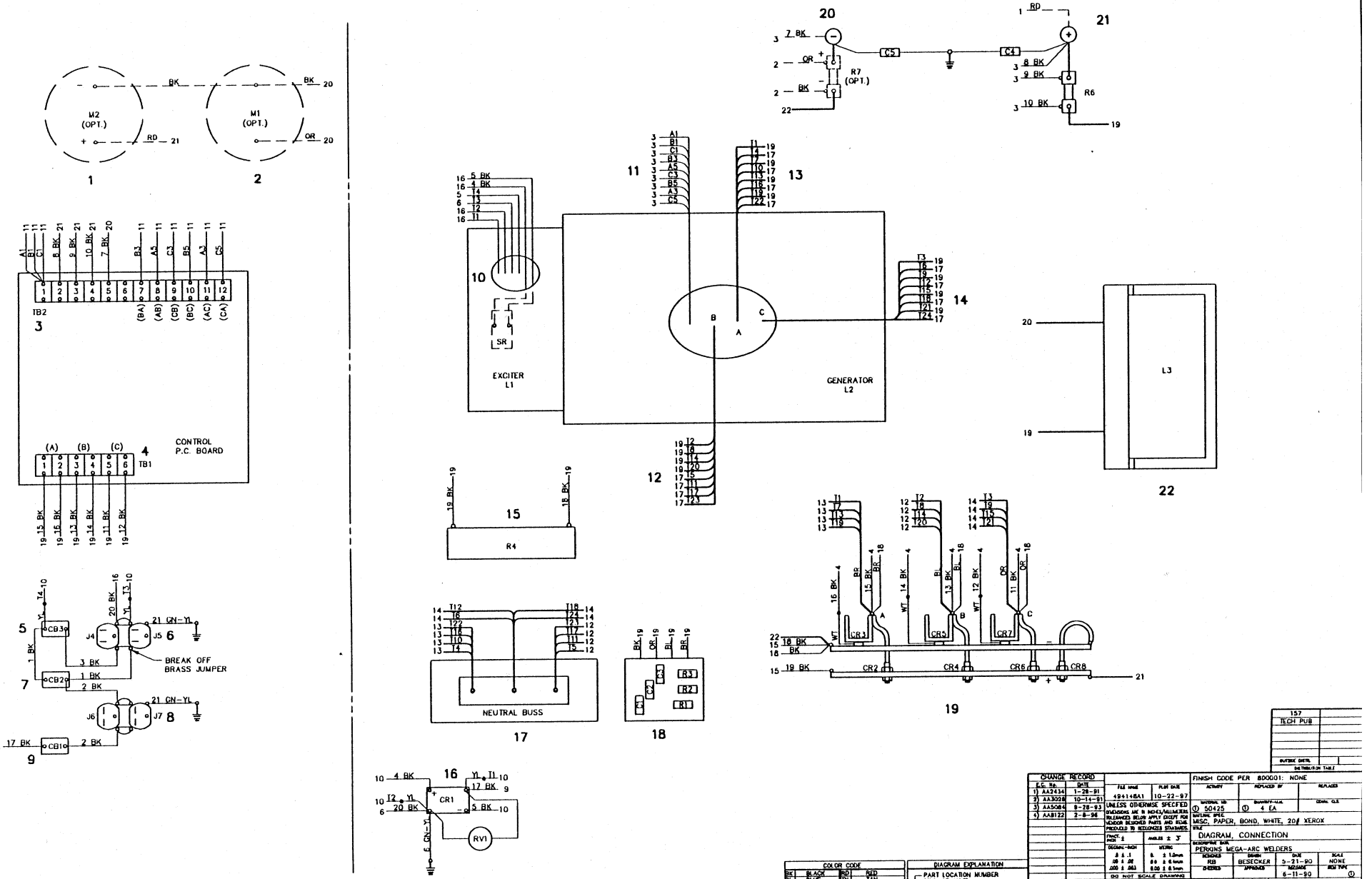
Ventilation: When PEL is exceeded.
Mechanical (general):
Local exhaust: preferred
Special:
Other: Adequate ventilation to maintain exposure concentrations below the PEL.

Protective Gloves: acid resistant (for example, rubber)
Eye Protection: Mandatory during handling and transfer of acid (recommend chemical goggles).
Other Protective Clothing or Equipment: acid resistant aprons, boots, protective clothing, and face shield
Protective Gloves: acid resistant (for example, rubber)
Work/Hygienic Practices: Good personal hygiene and work practices are mandatory.

DIAGRAMS

- Note the model and specification number shown on the equipment nameplate.
- Locate these numbers in the model and specification number columns below.
- Use only those diagrams and instructions that are applicable.

MODEL NUMBER	SPECIFICATION NUMBER	CONNECTION DIAGRAM	CONTROL BOX DIAGRAM	ENGINE DIAGRAM
Mega-Arc 4030D	6298C-1	494148A	494699	494148A
	6298D-1	494148A	494699	494148A



COLOR CODE			
BK	BLACK	RD	RED
BL	BLUE	TN	TAN
BR	BROWN	VT	VIOLET(PURPLE)
GN	GREEN	WT	WHITE
GY	GRAY	YL	YELLOW
OR	ORANGE	D	DARK (PREFIX)
PK	PINK	L	LIGHT(PREFIX)

DIAGRAM EXPLANATION

PART LOCATION NUMBER (END OF WIRE)
WIRE NUMBER
WIRE COLOR
27 RD
ABOVE OR LEFT OF WIRE

CHANGE RECORD		
E.C. No.	DATE	
1) AA24341	1-28-91	
2) AA30281	10-14-91	
3) AA50841	8-28-93	
4) AA81221	2-8-96	

FILE NAME	494148A1	PLOT DATE 10-22-97

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES/MILLIMETERS
TOLERANCES BELOW APPLY EXCEPT FOR HEAVY BLANKED PARTS AND FLUX PRODUCED TO RESIDENCE STANDARDS

FRACT ± 1/64
ANGLES ± 1°
DECIMAL-INCH: .X ± .1, .XX ± .02, .XXX ± .003
METRIC: X ± 1.0mm, XX ± 0.4mm, XXX ± 0.1mm
DO NOT SCALE DRAWING

FINISH CODE PER SD0001: NONE

ACTIVITY	REPLACED BY	REPLACES
1) 50425	1) 4 EA	

MATERIAL NO. | QUANTITY-ALL | COMM. CLS.
MATERIAL SPEC. MISC. PAPER, BOND, WHITE, 20# XEROX
TITLE DIAGRAM, CONNECTION
ENGINEERING NAME PERKINS MEGA-ARC WELDERS

DESIGNED	DRAWN	DATE	SCALE
RJB	BESECKER	5-21-90	NONE
CHECKED	APPROVED	RELEASED 6-11-90	WEIGHT TYPE ①

SIZE D | DRG. NO. 494148A | SHEET 1 OF 4

157 TECH PUB

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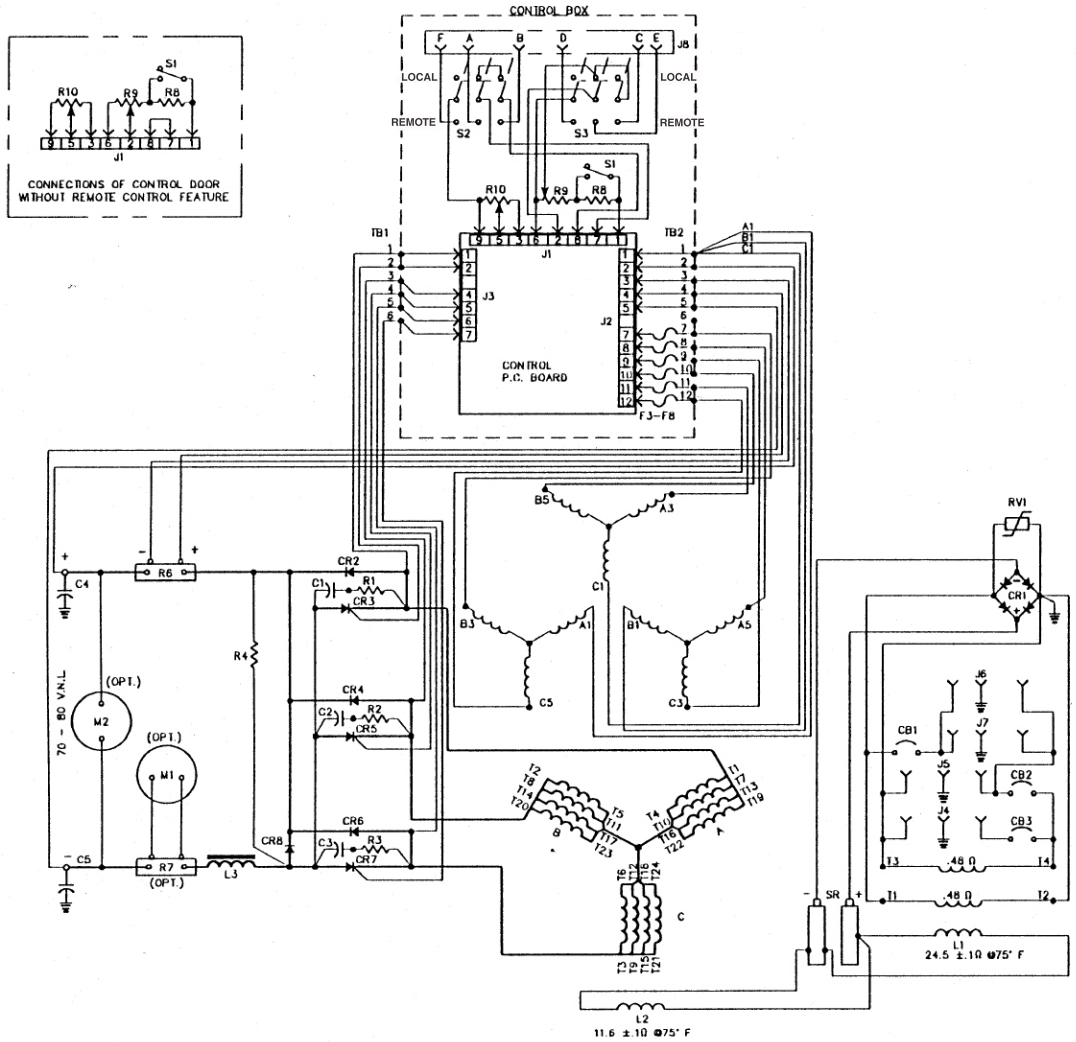
THERMAL ARC. A THERMADYNE Company TROY, OHIO 45373 U.S.A.



PARALLEL FIELD RESISTANCE = 7.9 ±.1Ω @ 75° F

NOTE: FOR RESISTANCE AT OTHER TEMPERATURES, ASSUME .24% PER DEGREE F.

LEGEND

C1,2,3	SNUBBER CAPACITORS, .047 MFD, 400VDC
C4,5	NOISE SUPPRESSION CAPACITORS
CB1,2,3	CIRCUIT BREAKERS, 15AMP
CR1	FIELD RECTIFIER BRIDGE
CR2,4,6,8	POWER DIODE
CR3,5,7	POWER SCR
CR10	WELDER, OUTPUT RECTIFIER
F3-F8	CIRCUIT BOARD FUSES
J1,2,3	CIRCUIT BOARD CONNECTORS
J4,5	115V. AUX. POWER OUTLET
J6,7	230V. AUX. POWER OUTLET
J8	RECEPTACLE, AMPHENOL, 6 PIN
L1	EXCITER
L2	GENERATOR
L3	FILTER CHOKE
M1	AMMETER (OPT.)
M2	VOLTMETER (OPT.)
R1,2,3	SNUBBER RESISTORS, 50 OHMS, 5 WATT
R4	PRELOAD RESISTOR, 50 OHM, 175 WATT
R6	FEEDBACK SHUNT
R7	METER SHUNT (OPT.)
R8	LOW RANGE RESISTOR
R9	CURRENT CONTROL POTENTIOMETER
R10	ARC FORCE POTENTIOMETER
S1	RANGE SWITCH
S2	SWITCH, TPDT, CONTACTOR CONTROL
S3	SWITCH, TPDT, CURRENT CONTROL
SR	SLIP RINGS
TB1,2	TERMINAL STRIP TO CONTROL BOX

THEORY OF OPERATION

THE AUXILIARY GENERATOR (EXCITER) IS SELF-EXCITED. THE DIODE BRIDGE RECTIFIER (CR1) RECTIFIES THE AC VOLTAGE OUTPUT OF THE AUXILIARY GENERATOR TO DC FOR THE REVOLVING FIELDS. THE AUXILIARY GENERATOR SUPPLIES POWER TO THE 115V. AND 230V RECEPTACLES.

THE OUTPUT OF THE 3 PHASE WELDING GENERATOR IS RECTIFIED TO DC POWER BY THE WELDER OUTPUT RECTIFIER (CR10), WITH THE OUPUT STABILIZED BY THE STABILITY REACTOR (L3). CURRENT CONTROL IS PROVIDED BY PHASE ANGLE FIRING OF SCR'S IN THE OUTPUT RECTIFIER BRIDGE (CR10).

157
TECH PUB

CHANGE RECORD			
E.C. No.	DATE		
1) AA2434	1-29-91		
2) AA4988	7-28-93		
3) AA7882	1-2-96		
4) AA8122	2-7-96		

FILE NAME	PLOT DATE	FINISH CODE PER B00001: NONE	
494148A2	10-22-97	ACTIVITY	REPLACED BY / REPLACES
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES/MILLIMETERS TOLERANCES BELOW APPLY EXCEPT FOR VENDOR DESIGNED PARTS AND ITEMS PRODUCED TO RECOGNIZED STANDARDS		MATERIAL NO.	QUANTITY-U.M. / CONF. D.S.
FRACT. ±	ANGLES ± 3°	ORIGINAL SPEC. SEE SHT 1	①
DECIMALS / MM	DECIMALS / MM	TITLE DIAGRAM, CONNECTION	
.X ± .1 / 2.5	.X ± 0.2mm / 5	DESCRIPTIVE TITLE SCHEMATIC	
.XX ± .03 / 0.8	.XX ± 0.1mm / 2.5	DESIGNED RDB	DRAWN RDB
.XXX ± .005 / 0.13	.XXX ± 0.13mm / 0.13	CHECKED	APPROVED
DO NOT SCALE DRAWING		DATE 5-21-90	SCALE NONE
		RECORDED 6-11-90	ITEM TYPE ①

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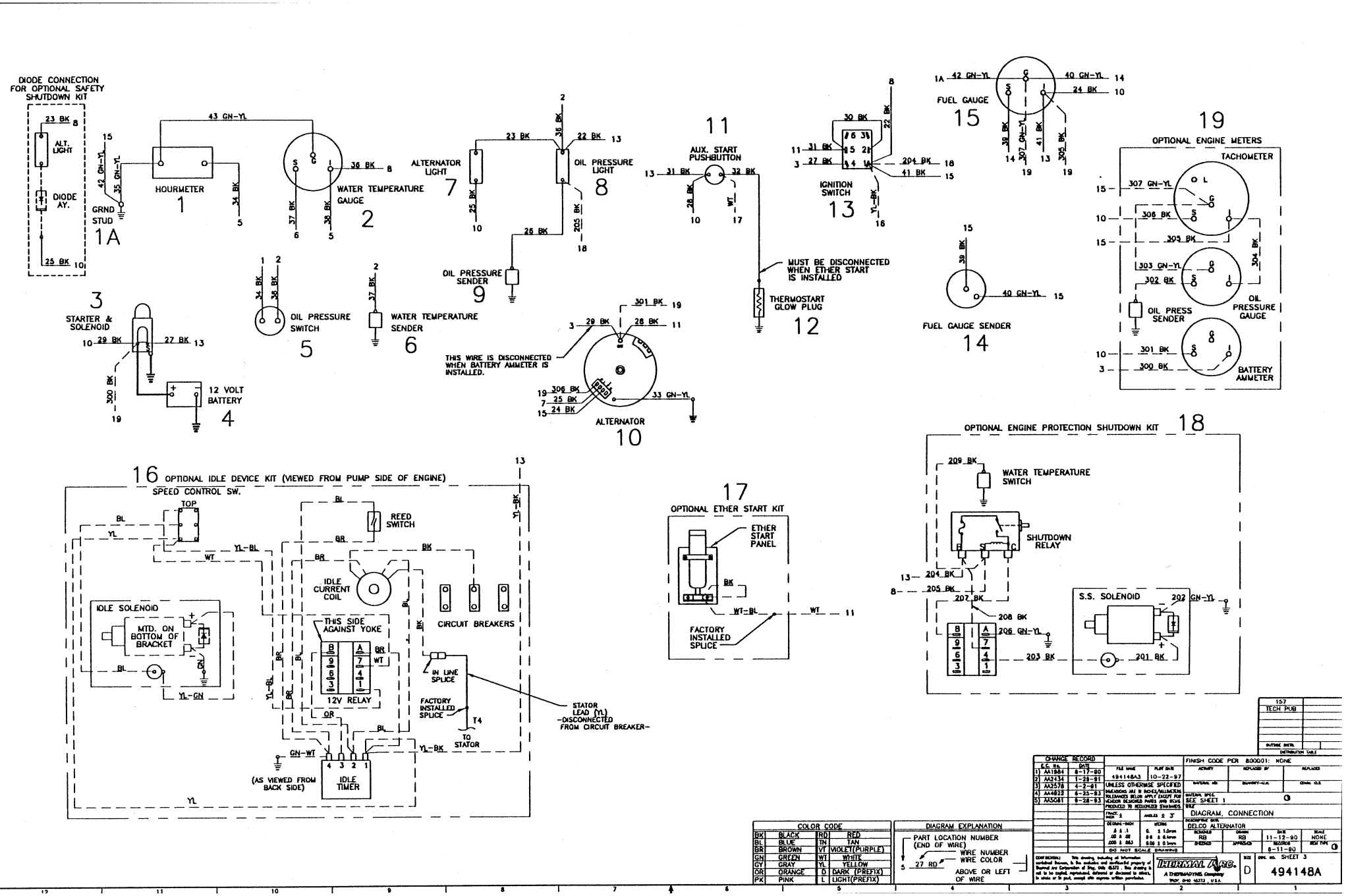
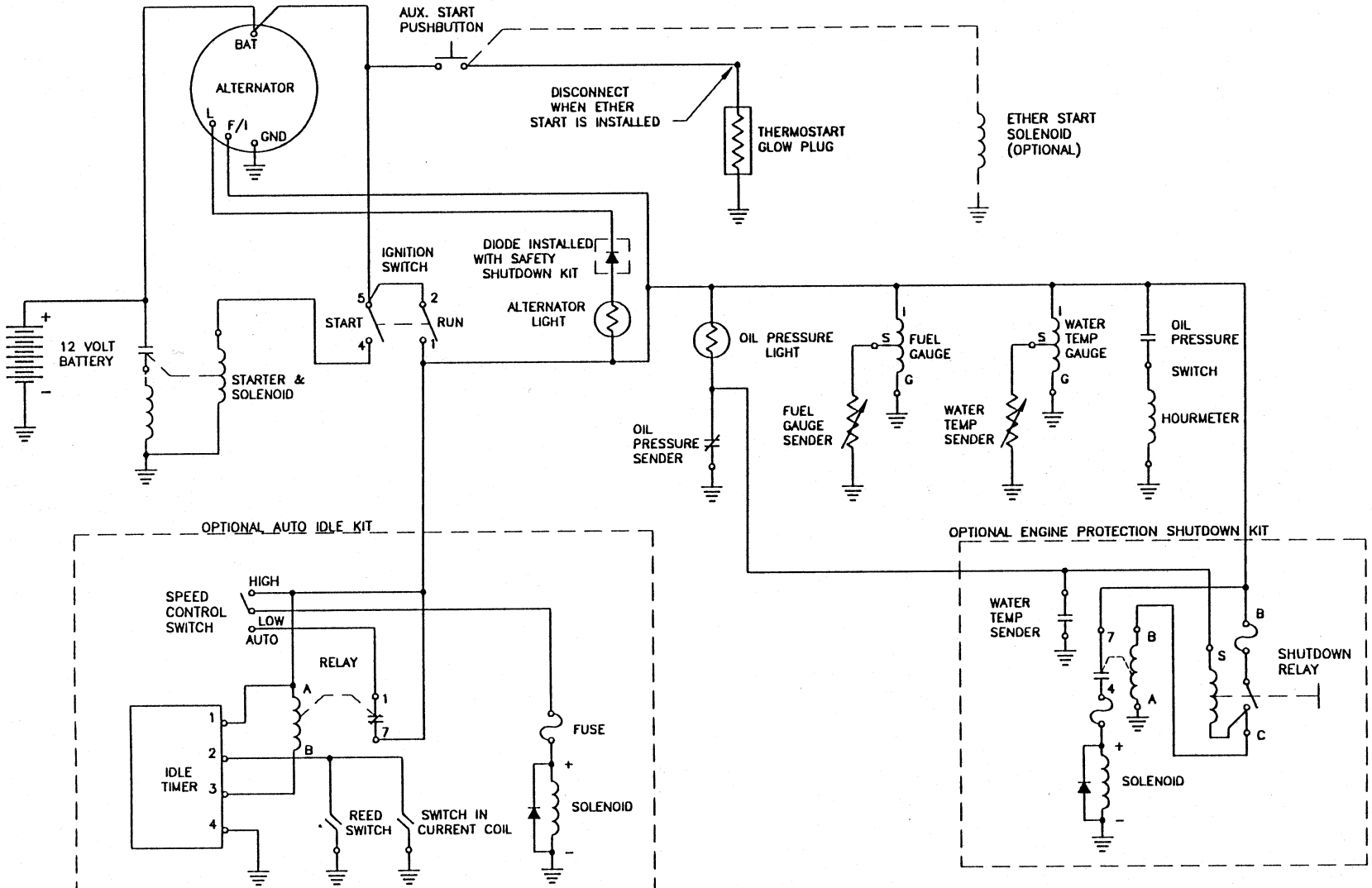
THERMAL ARC, A THERMADYNE Company TROY, OHIO 45373, U.S.A.

SIZE D | REV. NO. SHEET 2 | 494148A


DIODE CONNECTION FOR OPTIONAL SAFETY SHUTDOWN KIT
23 BK 8
ALT. LIGHT
DIODE AY.
25 BK 10
43 GN-YL
15
42 GN-YL
35 GN-YL
HOURMETER
1
GRND STUD
1A
34 BK
5
36 BK 8
WATER TEMPERATURE GAUGE
2
37 BK
6
38 BK
5
ALTERNATOR LIGHT
7
23 BK
25 BK
10
2
35 BK
22 BK 13
OIL PRESSURE LIGHT
8
26 BK
205 BK
18
OIL PRESSURE SENDER
9
11
AUX. START PUSHBUTTON
13 31 BK
32 BK
28 BK
10
WT
17
MUST BE DISCONNECTED WHEN ETHER START IS INSTALLED
THERMOSTART GLOW PLUG
12
8
30 BK
22 BK
11 31 BK
3 27 BK
204 BK 18
41 BK 15
IGNITION SWITCH
13
YL-BK
16
1A 42 GN-YL
40 GN-YL 14
24 BK 10
FUEL GAUGE
15
38 BK
14
307 GN-YL
41 BK
13
305 BK
19
19
15
39 BK
40 GN-YL 15
FUEL GAUGE SENDER
14
19
OPTIONAL ENGINE METERS
TACHOMETER
307 GN-YL
306 BK
303 BK
303 GN-YL
304 BK
302 BK
OIL PRESS SENDER
OIL PRESSURE GAUGE
301 BK
300 BK
BATTERY AMMETER
3
STARTER & SOLENOID
10 29 BK
27 BK 13
300 BK
19
12 VOLT BATTERY
4
1 2
34 BK
36 BK
OIL PRESSURE SWITCH
5
2
37 BK
WATER TEMPERATURE SENDER
6
THIS WIRE IS DISCONNECTED WHEN BATTERY AMMETER IS INSTALLED.
3 29 BK
301 BK 19
28 BK 11
19 306 BK
7 25 BK
15 24 BK
33 GN-YL
ALTERNATOR
10
16 OPTIONAL IDLE DEVICE KIT (VIEWED FROM PUMP SIDE OF ENGINE)
SPEED CONTROL SW.
TOP
BL
YL
YL-BL
WT
REED SWITCH
BR
BK
IDLE CURRENT COIL
CIRCUIT BREAKERS
IDLE SOLENOID
MTD. ON BOTTOM OF BRACKET
GN
YL-GN
THIS SIDE AGAINST YOKE
12V RELAY
OR
IN LINE SPLICE
FACTORY INSTALLED SPLICE
T4
TO STATOR
STATOR LEAD (YL) -DISCONNECTED FROM CIRCUIT BREAKER-
GN-WT
(AS VIEWED FROM BACK SIDE)
IDLE TIMER
4 3 2 1
YL-BK
13
17
OPTIONAL ETHER START KIT
ETHER START PANEL
BK
WT-BL
WT
11
FACTORY INSTALLED SPLICE
OPTIONAL ENGINE PROTECTION SHUTDOWN KIT
18
209 BK
WATER TEMPERATURE SWITCH
SHUTDOWN RELAY
13 204 BK
8 205 BK
207 BK
208 BK
206 GN-YL
203 BK
S.S. SOLENOID
202 GN-YL
201 BK
COLOR CODE
BK BLACK
BL BLUE
BR BROWN
GN GREEN
GY GRAY
OR ORANGE
PK PINK
RD RED
TN TAN
VT VIOLET(PURPLE)
WT WHITE
YL YELLOW
D DARK (PREFIX)
L LIGHT(PREFIX)
DIAGRAM EXPLANATION
PART LOCATION NUMBER (END OF WIRE)
WIRE NUMBER
WIRE COLOR
5 27 RD
ABOVE OR LEFT OF WIRE
157 TECH PUB
CHANGE RECORD
E.C. No. DATE
1) AA1904 6-17-80
2) AA2434 1-28-81
3) AA2578 4-2-81
4) AA4823 6-25-81
5) AA5081 6-28-83
FILE NAME 494148A3
PLOT DATE 10-22-97
UNLESS OTHERWISE SPECIFIED
FINISH CODE PER 800001: NONE
SEE SHEET 1
DIAGRAM, CONNECTION
DELCO ALTERNATOR
RB
11-12-90
8-11-80
THERMAL ARC
A THERMADYNE Company
SIZE D
SHEET 3
494148A



157
TECH PUB
OUTSIDE DISTR.
DISTRIBUTION TABLE

CHANGE RECORD					
E.C. No.	DATE	FILE NAME	PLOT DATE	FINISH CODE PER 800001: NONE	
1) AA2434	1-29-91	494148A4	10-22-97	ACTIVITY	REPLACED BY / REPLACES
2) AA4922		UNLESS OTHERWISE SPECIFIED		MATERIAL NO.	QUANTITY-U.M. / COMM. CLS.
		DIMENSIONS ARE IN INCHES/MILLIMETERS TOLERANCES BELOW APPLY EXCEPT FOR VENDOR DESIGNED PARTS AND ITEMS. PRODUCED TO RECOGNIZED STANDARDS.		MATERIAL SPEC. SEE SHEET 1	
		FRACT. ± / ANGLES ± 3°		TITLE DIAGRAM, CONNECTION	
		DECIMAL-INCH: .0 ± .1; .00 ± .02; .000 ± .003 / 0. ± 1.0mm; 0.0 ± 0.4mm; 0.00 ± 0.1mm		DESCRIPTIVE DATA DELCO ALTERNATOR	
		DO NOT SCALE DRAWING		DESIGNED BAM / DRAWN JLC / DATE 5-14-90 / SCALE NONE	
				CHECKED / APPROVED / RECORDS 6-11-90 / ITEM TYPE O	

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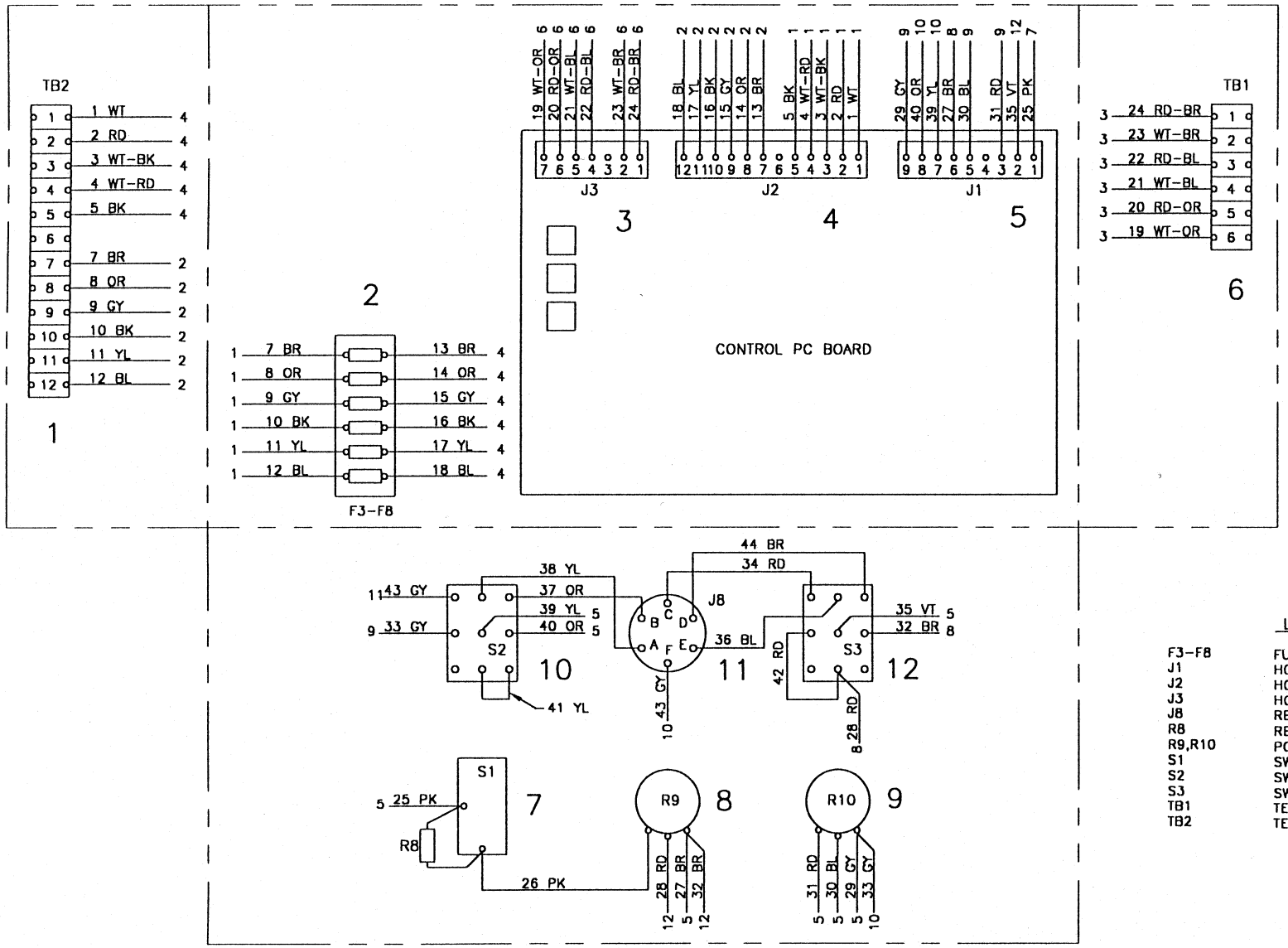
THERMAL ARC. A THERMADYNE Company TROY, OHIO 45373, U.S.A.

SIZE C | DWG. NO. 494148A | SHEET 4



LEGEND

F3-F8	FUSE, 1 AMP, AGC, FAST BLOW
J1	HOUSING, RECEPTACLE, 9 STA
J2	HOUSING, RECEPTACLE, 12 STA
J3	HOUSING, RECEPTACLE, 7 STA
J8	RECEPTACLE, AMPHENOL, 6 PIN
R8	RESISTOR, 1/2W
R9,R10	POTENTIOMETER, 2W, 5K
S1	SWITCH, SPST
S2	SWITCH, TPDT
S3	SWITCH, TPDT
TB1	TERMINAL BLOCK, 6 STA
TB2	TERMINAL BLOCK, 12 STA

COLOR CODE			
BK	BLACK	RD	RED
BL	BLUE	TN	TAN
BR	BROWN	VT	VIOLET(PURPLE)
GN	GREEN	WT	WHITE
GY	GRAY	YL	YELLOW
OR	ORANGE	D	DARK (PREFIX)
PK	PINK	L	LIGHT(PREFIX)

DIAGRAM EXPLANATION

PART LOCATION NUMBER (END OF WIRE)
WIRE NUMBER
WIRE COLOR
ABOVE OR LEFT OF WIRE
5 27 RD

157	9/93
TECH PUB	
OUTSIDE DISTR.	

DISTRIBUTION TABLE

CHANGE RECORD	
E.C. No.	DATE

FILE NAME	494699
PLOT DATE	10-22-97

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES/MILLIMETERS
TOLERANCES BELOW APPLY EXCEPT FOR VENDOR DESIGNED PARTS AND ITEMS. PRODUCED TO RECOGNIZED STANDARDS.

FRACT. INCH ±
ANGLES ± 3°
DECIMAL-INCH
.0 ± .1
.00 ± .02
.000 ± .003
0. ± 1.0mm
0.0 ± 0.4mm
0.00 ± 0.1mm
DO NOT SCALE DRAWING

FINISH CODE PER 800001: NONE

ACTIVITY	REPLACED BY	REPLACES
MATERIAL NO.	QUANTITY-U.M.	COMM. CLS.

MATERIAL SPEC.

TITLE
DIAGRAM, CONTROL BOX CONNECTION
DESCRIPTIVE DATA
WITH REMOTE CONTROL FEATURE

DESIGNED	DRAWN	DATE	SCALE
RB	RB	7-22-93	NONE
CHECKED	APPROVED	RECORDS	ITEM TYPE
		9-28-93	

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THERMAL ARC
A THERMADYNE Company
TROY, OHIO 45373, U.S.A.

SIZE C

DWG. NO. 494699

SHEET

STATEMENT OF WARRANTY

LIMITED WARRANTY: Thermal Arc®, Inc., A Thermadyne Company, warrants that its products will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within the time period applicable to the Thermal Arc products as stated below, Thermal Arc shall, upon notification thereof and substantiation that the product has been stored, installed, operated, and maintained in accordance with Thermal Arc's specifications, instructions, recommendations and recognized standard industry practice, and not subject to misuse, repair, neglect, alteration, or accident, correct such defects by suitable repair or replacement, at Thermal Arc's sole option, of any components or parts of the product determined by Thermal Arc to be defective.

THERMAL ARC MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHERS, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF LIABILITY: Thermal Arc shall not under any circumstances be liable for special or consequential damages, such as, but not limited to, damage or loss of purchased or replacement goods, or claims of customers of distributor (hereinafter "Purchaser") for service interruption. The remedies of the Purchaser set forth herein are exclusive and the liability of Thermal Arc with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any goods covered by or furnished by Thermal Arc whether arising out of contract, negligence, strike tort, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which such liability is based. No employee, agent, or representative of Thermal Arc is authorized to change this warranty in any way or grant any other warranty.

PURCHASER'S RIGHTS UNDER THIS WARRANTY ARE VOID IF REPLACEMENT PARTS OR ACCESSORIES ARE USED WHICH IN THERMAL ARC'S SOLE JUDGMENT MAY IMPAIR THE SAFETY OR PERFORMANCE OF ANY THERMAL ARC PRODUCT.

PURCHASER'S RIGHTS UNDER THIS WARRANTY ARE VOID IF THE PRODUCT IS SOLD TO PURCHASER BY NON-AUTHORIZED PERSONS.

Except with regards to the products listed below, this warranty shall remain effective three (3) years from the date Thermal Arc's authorized distributor delivers the product to Purchaser, but in no event more than (4) years from the date Thermal Arc delivers the product to the authorized distributor.

Shorter warranty periods apply to the products listed below. On these products, the warranty is effective for the time stated below beginning on the date that the authorized distributor delivers the products to the Purchaser. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date Thermal Arc delivered the product to the authorized distributor.

	ALL OTHER	**P-WEE, PRO-LITE**	
POWER SUPPLIES	POWER SUPPLIES	PRO-PLUS, PRO-WAVE	LABOR
MAIN POWER MAGNETICS (STATIC & ROTATING)	3 YEARS	2 YEARS	1 YEAR
ORIGINAL MAIN POWER RECTIFIER	3 YEARS	2 YEARS	1 YEAR
CONTROL PC BOARD	3 YEARS	2 YEARS	1 YEAR
ALL OTHER CIRCUITS AND COMPONENTS INCLUDING BUT NOT LIMITED TO, CONTACTORS, RELAYS, SOLENOID, PUMPS, POWER SWITCHING SEMI-CONDUCTORS	1 YEAR	1 YEAR	1 YEAR
ENGINES: ENGINES ARE NOT WARRANTED BY THERMAL ARC, ALTHOUGH MOST ARE WARRANTED BY THE ENGINE MANUFACTURER. SEE THE ENGINE MANUFACTURES WARRANTY FOR DETAILS.			
CONSOLES, CONTROL EQUIPMENT, HEAT EXCHANGES, AND ACCESSORY EQUIPMENT	1 YEAR	1 YEAR	1 YEAR
TORCH AND LEADS	180 DAYS	180 DAYS	180 DAYS
REPAIR/REPLACEMENT PARTS	90 DAYS	90 DAYS	90 DAYS

Warranty repairs or replacement claims under this limited warranty must be submitted to Thermal Arc by an authorized Thermal Arc® repair facility within thirty (30) days of the repair. No transportation costs of any kind will be paid under this warranty. Transportation charges to send products to an authorized warranty repair facility shall be the responsibility of the customer. All returned goods shall be at the customer's risk and expense. This warranty supersedes all previous Thermal Arc warranties.

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